UNIVERSITY OF CAPE TOWN

FACTORS ASSOCIATED WITH LATE ANTENATAL CARE ATTENDANCE

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Master in Medicine Public Health

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Without the caring support from my family for my academic work, the meaning of my accomplishments would diminish. Special thanks, to my mother who looked after my daughter during this project and to my husband Saul for his constant support and encouragement.

DECLARATION

The work presented in this report represents analyses of data collected as part of FAS prevention programme in Western Cape and Gauteng. The role of the author in the study was data analyses and writing up of all chapters of this thesis, under the supervision of Professor Leslie London. In this regard the analyses presented in this thesis are the original work of the author and have not been submitted for other degree purposes, or publication before. All sources of this work have been appropriately cited.

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ABSTRACT

Background:

The prevalence of late attendance for antenatal care in South Africa remains high despite the reported benefits of early initiation of antenatal care. The study aimed at identifying factors associated with late initiation of antenatal care.

Methods:

Cross sectional survey data collected for a FAS prevention programme in rural and urban South Africa were used. The primary study made use of face-to-face interviews with female participants the age range of 18 to 44 years. The dependent variable, gestational age, was categorized into a binary variable across 4 months gestational age. Independent variables consisted of scales and categorical variables (mostly binary) within the following domains: (a) socio-demographic factors; (b) characteristics of index pregnancy including substance use information; (c) psycho-social factors; (d) community factors; and (e) partner characteristics

Results:

A sample of 802 women participated in the study, 354 from a rural area in the Western Cape and 448 from an urban area in Gauteng province of South Africa. A higher proportion of urban women attended ANC late as compared to rural women, (32.6% vs. 25.6%, $\chi^2 = 4.5$, $p = 0.034$). The rural and urban women had significantly different demographic profiles. The rural area included mainly colored people (90%) versus 82% black people in the urban area ($\chi^2 = 434.3$, $p < 0.001$). Urban participants were better educated (90% had grade 8 or more education in urban areas versus 38% in rural areas; $\chi^2 = 216$; $p < 0.001$) and had higher household socio-economic status (SES) (45% reported 5 or more possessions in urban areas compared to 25% in rural

areas; χ^2 =31.5; p< 0.001) but were less likely to be employed (45% in urban areas compared to 81% in rural areas; χ^2 = 125.2; p<0.0001).

The rural women reported lower self esteem (74% vs. 55%, χ^2 = 199, p<0.001), higher social capital (45.2 vs. 26.8%; χ^2 = 22.5; p < 0.001), were less religious (77.4% vs. 83.7%; χ^2 = 5; p < 0.001) and more likely to drink alcohol (41.6% vs. 10.5%; χ^2 = 100; p < 0.001) and smoke cigarettes (58.4% vs. 11%; χ^2 = 97; p < 0.001) as compared to urban women.

A higher proportion of urban women delivered by caesarean section (23% vs.14%, χ^2=11.12 p = 0.001) and were more likely to attend ANC in the private sector (16% vs. 4%; χ^2 = 29.5, p < 0.001) and deliver in the private sector (15% vs. 3%, χ^2 = 30.1, p < 0.01) as compared to rural women.

In urban areas, high socio-economic status (OR = 0.41, 95% CI: 0.24-0.71), previous miscarriage (OR = 0.36, 95% CI: 0.18-0.73), private sector utilization (OR = 0.43, 95% CI: 0.19-0.99), desire to be pregnant (OR = 0.6, 95% CI: 0.36-1.00) and having a partner who was employed (OR = 0.57, 95% CI: 0.32-1) were significantly protective of late ANC attendance, whilst having a partner with low education (OR =2.92, 95% CI: 1.38 - 6.16), and being pregnant for the first time of having only 1 child compared to two or more children (OR = 1.98, 95% CI: 1.11-3.5) were associated with an increased risk of late ANC attendance. There were no significant associations on multivariate analysis for late antenatal care in the rural area as the sample was homogenous.

Conclusion:

The study confirms the socio-demographic and psychosocial differences between rural and urban populations and increased rate of late antenatal care attendance consistent with literature.

The following factors were protective against late initiation of antenatal care amongst urban women: high socioeconomic status, use of private sector for ANC as main provider, desire to be pregnant, a previous history of miscarriage and having an employed partner. Factors that increased the risk of late initiation of antenatal care were low level of partner education and being nulliparous/primiparous (Women who were pregnant for the first time or had only 1 child the study period).

Recommendations:

Population factors associated with late antenatal care attendance such as **low SES, low partner education** and **a lack of partner employment** need to be addressed using multi-sectoral approaches. Strategies to improve job creation need to address the lack of work, particularly skilled labour opportunities for women and improve access and quality of primary and high school education, and access to post high school education.

Use of the private sector was associated with early antenatal access. Strategies to improve access to government facilities and addressing issues that result in negative attitudes towards patients such as low morale and burn-out amongst staff, would assist in improving early access to antenatal care. Staff morale and negative attitudes should be addressed through improved human resource management in the Department of

Health. Implementing daily ANC services throughout public facilities would ensure that ANC is initiated earlier and address the long waiting times. General Practitioners (GPs) in private health care services should be trained in basic antenatal care guidelines, provided with a national ANC card and encouraged to initiate ANC care within available resources and refer women to public health sector early. The proposed NHI is likely to address continuation of care when patients move between public and private sector. The media such as radio, television and billboards can also be used to educate the public on benefits and risks associated with late antenatal care attendance.

Individual factors associated with early access to ANC include desire to be pregnant, being pregnant for the first time and history of miscarriage. Unwanted pregnancy can be prevented by improving access to family planning through integrating this services with polyclinics and using private providers (such as pharmacies and PHC nurses) to assist provision of free contraceptive services at a minimal cost. Teenagers, particularly, deserve special attention regarding access to family planning – on top of improving access to ANC; this group should be educated on delaying the age of first intercourse. Since a history of miscarriage was protective of late ANC; programmes that recruit women with experience of pregnancy complications as peer educators could be considered.

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1. INTRODUCTION

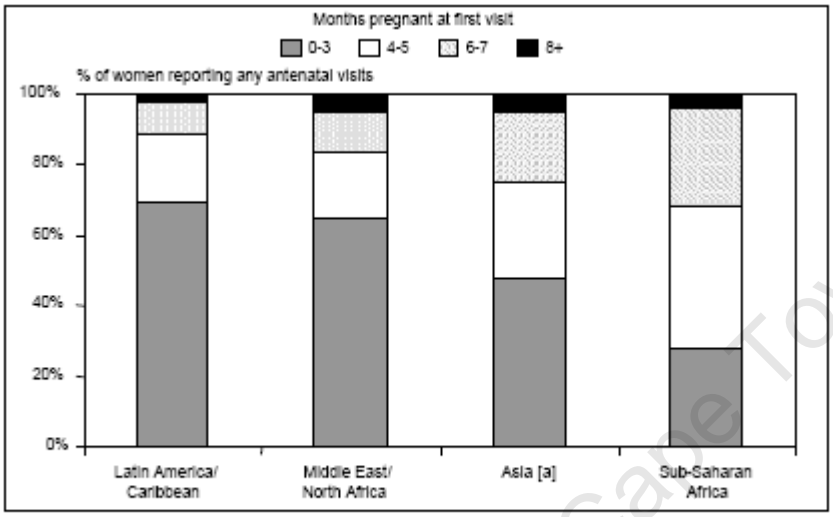
Antenatal care is care of a woman and her offspring during pregnancy to prevent and minimise risks of morbidity and mortality in the mother and baby. Early entry to antenatal care (ANC) is important for the early detection and treatment of adverse pregnancy related outcomes. The World Health Organization (WHO) recommends that pregnant women in developing countries should seek ANC within the first 4 months of pregnancy.[1] In developed countries such as the United Kingdom and Australia, ANC is recommended within the first 12 weeks of pregnancy.[2,3] In South Africa, ANC is recommended within first 20 weeks of pregnancy.[4]

The WHO recently recommended a reduction in the number of ANC visits in developing countries because of evidence suggesting that having fewer ANC visits do not affect the outcomes of care, other than women's satisfaction levels.[4, 5] Ideally, care needs to be initiated before conception in order to address maternal health risk factors that can potentially affect the foetus.

In their analysis to report trends in antenatal care in developing countries, AbouZahr and Wardlaw (2003) reported that only 20% of women in Sub-Saharan Africa book for antenatal care within the first 3 months of pregnancy[6] (see Figure 1 % for timing of first antenatal visit). The majority of pregnant women in South Africa attend antenatal care late. Studies have reported that 60% to 90% of women in South Africa attend late for antenatal care. [7-12]

There have been many studies on factors relating to late entry to antenatal care internationally. However, there is limited information on the factors related to late entry to ANC in South Africa.

Figure 1: Timing of First ANC Attendance by Region



[a] Excluding China

Source: AbouZahr and Wardlaw, 2002. DHS surveys in 45 developing countries.

In 2006, a project to develop a comprehensive foetal alcohol syndrome prevention model was started in South Africa. The project included a baseline household survey to determine the prevalence and predictors of being at risk of an alcohol-exposed pregnancy (AEP) among women of child-bearing age in an urban and rural location in South Africa. The data collected for this study included socio-demographic factors, history of the last pregnancy, substance use variables and partner characteristics, amongst other.[13] It was from the availability of this data and lack of further studies on factors associated with late attendance of antenatal care that the study concept was developed.

Background on Antenatal Care in South Africa

According to the national guidelines for maternity care in South Africa, basic antenatal care can be offered in all health facilities [4]. The majority of basic antenatal care is offered at primary health care level. Care in level 1 (district), level 2 (regional) and level 3 (tertiary) hospitals is reserved for patients with increasing levels of complications. There is provision for all primary health care clinics to offer emergency inter-partum care (e.g. women who arrive with head on perineum) depending on staffing and equipment. However, only community health centres and hospitals can deliver both emergency and non-emergency cases. Community health centres can deliver only low-risk patients, whilst high-risk patients, such as women with coexisting medical illness, multiple pregnancy, previous bad obstetric history, previous caesarean section and grand multiparous women, are referred to hospital for delivery.[4]

According to this guideline, if a woman had attended antenatal care within the first 19 weeks of pregnancy then they will be followed up at 24 weeks, 32 weeks, 36 weeks and every 2 weeks thereafter.[4] Therefore, according to this schedule, a woman attending for antenatal care before 20 weeks of pregnancy would have between four and six visits during the pregnancy. All the women under antenatal care are screened for anaemia, syphilis, HIV, hypertension, diabetes and proteinuria at the first visit. Iron supplements and folic acid (only in the first trimester) are given to all pregnant women. Tetanus toxoid is recommended in areas where neonatal tetanus is prevalent. The gestational age is determined at the first visit using height of fundus or last menstrual period. Subsequent visits are for follow-up of results, managing any pathologies detected by screening tests and detection of any pregnancy-related

complications that may develop.[4] Women who are known to be HIV positive or detected after compulsory counselling and voluntary HIV testing can enrol for the PMTCT programme and receive AZT at 7 months (28 weeks) gestational age.[14]

In 2002, the WHO recommended a new model of care which consisted of 4 visits per pregnant mother.[5] The WHO recommended that when women attend, if the first visit is before 20 weeks, then subsequent visit should be timed at 26 weeks, 32 weeks, and some time between 36 and 38 weeks.[1, 5] The WHO recommends a minimum of 4 visits during pregnancy. The schedule of visits recommended by the WHO is similar to the schedule prescribed in the South African guidelines, with exception of visits after 39 weeks: the WHO guidelines recommend that women be advised to present themselves in delivery unit if they have not delivered by 41 weeks.[5] In South Africa, women are followed up weekly after 39 weeks of pregnancy.[4]

2 LITERATURE REVIEW

2.1 Magnitude of Late Antenatal Care Attendance

International studies

In a study of ten European countries to identify barriers of ANC care, Delvaux et al (2001) reported 53% of women received adequate antenatal care (attended within the first trimester and completed more than three antenatal visits). Twenty four percent of women attended antenatal care after the first trimester but attended for more than 3 visits, 11% of women attended late and did not attend adequately (less than 3 visits) and 12.3% of women did not receive any antenatal care at all.[15]

In a level 2 hospital-based prospective study on the relationship of prenatal care and perinatal morbidity in low birth weight infants in USA, Herbst et al (2003) reported a mean gestational age of 12 weeks. When a cut-off of 13 weeks was used, only 62% of women had attended antenatal care earlier than 13 weeks of pregnancy.[16]

Lastly, in a Jamiacan perinatal mortality survey, by McCaw-Binns et al (1995), 4% of women did not attend antenatal care, 61% attended in the 2nd trimester and 10% attended in the last trimester – meaning that only 21% attended in the first trimester.[17]

African studies

In a cross-sectional study to determine factors influencing gestational age at initiation of antenatal care in a tertiary hospital in Nigeria in 2006, Okunlola et al, (2006) reported a mean gestational age of 21±7 weeks. Only 29% of women had attended before 14 weeks of pregnancy and 71% attended after 14 weeks of pregnancy.[18] In the same country two years later, a tertiary hospital based study by Adekanle and

Isawumi (2008) reported that 81.5% of pregnant women attended antenatal care after 13 weeks of pregnancy.[19] In a Malawian study by Brabin et al (1998) authors reported that only 12.5% of adolescent defined as < 18 years attended before 16 weeks of pregnancy.[20]

South African studies

In a Cape Town-based study to evaluate effect of urinary testing for pregnancy on timing of antenatal attendance, Moodley and Morroni (2007) reported that the median age of presentation was 23 weeks (IQR 18 - 27). Of the sample of women that they were observing only 5.8% presented within the first trimester of pregnancy.[7] Routine data collected from District Health Information system (DHIS) in a rural province in South Africa indicates that only 12% of women attend before 20 weeks of pregnancy.[8]

A Durban tertiary hospital- based South African study by Sibeko and Moodley (2006) reported that 23% of women attended antenatal care before 20 weeks of pregnancy, 47.9% of women attended after 20 weeks and 28.7% did not attend antenatal care at all.[9] The estimate of unattended women is likely to be inflated as the authors disregarded private care and categorised women as non-attenders if antenatal care was provided in the private sector. The authors also used maternity records to determine attending status of non-attenders, whilst a questionnaire was used for late-attenders and early-attenders. These different methods of collecting data on attendance status might have resulted in differential misclassification, which is likely to inflate the proportion of women not attending for antenatal care.

The same study by Sibeko and Moodley (2006) reported following findings: a total of 30.9% of women had confirmed their pregnancy 2 months after the last menstrual period, 60% of women confirmed pregnancy in a public sector, 35% in a private sector and 4% diagnosed pregnancy themselves. The majority of early attenders confirmed pregnancy at 2 months, late attenders at 3 months. Women who had their pregnancy confirmed were more likely to attend early for antenatal care. The majority of women did not adhere to a specific schedule for ANC. Of those who had attended earlier, only 12% attended ANC more than once. Amongst late attenders, 38.9% attended ANC more than once. This indicates that early attending does not necessarily result in compliance with all the recommended 4 to 6 visits for antenatal care before delivery.[9] The authors reported an average delay of 3 months between confirmation of pregnancy and initiation of antenatal care amongst attenders, which means that beside late diagnosis of pregnancy, there are other factors that lead to delay initiation of antenatal care.

Sibeko's study is in agreement with Jewkes' qualitative study on health care seeking practices of pregnant women in Cape Town.[9, 10] Jewkes et al reported that women noticed that they were pregnant as soon as they missed a period, but only concluded that they are pregnant after missing 2-3 periods. Most of the women in the study confirmed their pregnancy with a private doctor.[10]

According to South African Demographic and Health Survey of 2003, 5.3 % of women did not attend ANC, 32% attended before 4 months gestational age 30% between 4 and 5 months, 26% between 6 and 7 months and 12 % after 8 months.[12] Urban women were more likely **not** to attend ANC (5.8% VS. 4.4%), however a

higher percentage of urban women attended before 4 months gestational age as compared to the rural women (34.5% vs. 26.6%). The median gestational age of starting antenatal care was 5 months for SA as a whole and 4.7 and 5.2 months for urban and rural women respectively. Regional differences were also identified, for example: A higher proportion of women in Western Cape were more likely to be attended by a doctor in antenatal care and delivery as compared to Gauteng Province.[12]

A cross sectional study in a rural district of KZN reported that 9% of women attended antenatal care within first trimester of pregnancy; women on average attended 6 antenatal visits before delivery.[19]

The above literature review indicates that late antenatal care attendance is a problem worldwide. In developed countries between 24% and 36% of women attend late for antenatal care, whereas in South Africa and developing countries 68% to 91% of women attend late for antenatal care. Table 1 summarises the percentages of women reported to attend ANC early in different studies around the world.

Table 1: Percentage of Women Attending ANC Early around the World

Authors	Type of study	Definition of early attendance	Country	Percentage attending antenatal care early
Delvaux et al[15]	Hospital based case–control study	< 3 months	Ten European Countries	53%
Herbst et al[16]	Hospital based prospective study	< 13 weeks	USA	62%
Kupek et al[21]	Cross sectional study	< 10 weeks	United Kingdom	93%
Sunil et al[22]	Cross sectional survey	Within first trimester	USA	60%
Mc Caw-Binns[11]	Perinatal mortality survey	< 3 months	Jamaica	21%
Okunlola et al[18]	Level 3 Hospital based cross sectional study	< 14 weeks	Nigeria	29%
Adekanle et al[19]	Level 3 based cross sectional study	< 13 weeks	Nigeria	19.5%
Brabin et al[20]	Hospital based cross sectional study	< 16 weeks	Malawi	12.%
Moodley and Morroni[7]	Cross sectional study (PHC facility based)	< 3 months	South Africa, Cape Town	5.8%
DHIS (2007) [8]	Routinely collected facility data (District hospitals and PHC facilities)	< 20weeks	South Africa, Mpumalanga	12%
Sibeko et al[9]	Level 3 hospital based cross sectional study	< 20 weeks	South Africa, Durban	23%
Hoque et al[11]	Hospital based cross sectional survey	< 3 months	South Africa, rural KZN	9%
SADHS[12]	Community Survey	< 4 months	South Africa	32%

2.2 Benefits of Early Antenatal Care Attendance

Antenatal care is care of a healthy mother using evidence based interventions to screen, prevent and treat conditions that may lead to maternal and perinatal mortality.[40] Antenatal care is better when started prior to conception; however, the majority of women start antenatal care after conception. The first 12 weeks of pregnancy are critical for neural tube development. Folic acid is given in the first 3 months to prevent neural tube defects. Ferrous sulphate is given to prevent anaemia. Mothers with poor nutritional status are given food supplements as well as multivitamins.

Antenatal care allows women to be screened and treated for conditions such as sexually transmitted illnesses, HIV, anaemia, TB, gestational diabetes, hypertension and malaria (in endemic areas). Other life style behaviours such as alcohol consumption, smoking and drug use may also be addressed.[23]

Foetal growth monitoring assists in early identification of foetal growth retardation, and facilitates early interventions to prevent perinatal mortality.[23] In the developed countries women are scanned at 20 weeks to exclude foetal abnormality.[2] Pregnancy scanning is not part of routine ANC care in South Africa, but can be requested if there is an increased risk of foetal anomalies e.g. mothers older than 40 years.

Women receive education during antenatal care on feeding practices, use of health facilities for delivery, identification of early signs of labour, care of the newborn and the importance of immunisation.[1, 4, 23]

Early access to antenatal care and HIV

With no antenatal interventions, mother to child vertical transmission of HIV likely to be between 14% and 50%, this transmission can be reduced with an effective prevention of mother to child transmission (PMTCT) programme. [25]

In their prospective cohort, Cooper et al (2008), reported mother to child transmission for HIV of 20.0% (95% CI 16.1% - 23.9%) in women who did not receive antenatal antiretroviral therapy; 10.4% (95% CI 8.2% - 12.6%) in women who received Zidovudine (ZDV) monotherapy; 3.8% (95% CI 1.1% - 6.5%) in women receiving dual antiretroviral therapy; and 1.2% (95% CI 0 - 2.5%) for 250 receiving highly active antiretroviral therapy (HAART). [26]

The odds of transmission increased 2 fold (95% CI 1.7 - 3.5) for every log10 increase in viral load at the time of delivery. In multivariate analyses, adjusting for maternal viral load, duration of therapy and other factors, the odds ratio for transmission for women receiving dual therapy and HAART compared with those receiving ZDV monotherapy was 0.30 (95% CI, 0.09 - 1.02) and 0.27 (95% CI, 0.08 - 0.94), respectively, meaning that HAART and dual therapy were more efficient in preventing mother to child transmission as compared to monotherapy, with HAART having slightly superior results as compared to dual therapy. [26]

Dickover et al (1996) reported that women with high viral load (> 50 000copies/ml) were more likely to transmit viruses to their infants (75% vs. 5.3% $p < 0.001$). There was a 0% transmission in women with viral load < 20000.[27]

Another RCT reported a large reduction in the frequency of transmission from 25.5% in the placebo group to 8.3% in the AZT group. The difference of 17% (95% CI 9 – 26; $p < 0.001$) is equivalent to a 68% reduction in the risk of transmission.[28]

Mofenson et al (1999) looked at predictors of viral load suppression in women who received AZT, in an RCT trial comparing outcomes in women receiving AZT and placebo. They reported a 3-fold increase risk in mother to child transmission for every log increase in viral load in women receiving AZT. [29] A study to determine time required to suppress viral load found that an average of 73 days (almost 10 weeks) was required to suppress viral load to less than 50 copies per ml.[30]

The literature above further stresses the need for women to attend early so that prophylactic or therapeutic antiretroviral treatment can be initiated early so that by time of delivery viral load has decreased to less risky levels. Even when the women do not require HAART, initiating antenatal care early can ensure that women who test positive can enrol for PMTCT programme on time, the time between diagnoses of HIV and initiating anti-retroviral medication for PMTCT will allow women to disclose their status and deal with the psychosocial factors that may adversely affect adherence to prophylactic treatment.

2.3 Effects of Late Antenatal Care Attendance

Perinatal mortality and maternal mortality are the main indicators of maternal health care and remain high in South Africa despite the introduction of free maternity care in the public sector facilities in 1994.[31]

2.3.1 Effects of late Antenatal Care attendance of maternal mortality

Lack of antenatal care has been implicated in the increased maternal mortality. The South African Inquiry into Maternal Deaths (1998) and South African Health and Demographic and Health Survey (2003) have both estimated maternal mortality rate (MMR) of almost 150/100 000 live births, which is far higher than MMR of 14/100 000 births in the United Kingdom.[12,32,33] The South African Inquiry into Maternal Deaths indicated that the five top causes of death, which made up 73% of all maternal deaths, include complications of hypertensive conditions in pregnancy (23.2%), AIDS (14.5%), obstetric haemorrhage (13.3%), pregnancy-related sepsis (11,9), and pre-existing medical conditions, mainly pre-existing cardiac disease (10.4%). Lack of antenatal care has been implicated as the main patient factor associated with the increased mortality. [12, 21, 32]

An American study reported an increased risk of chorio-amnionitis (RR = 1.6; p = 0.02) and a four-fold increased risk of cervical dilatation of more than 4 cm i.e. presenting in active phase of labour (RR = 4.4; p = 0.008) amongst women who did not attend antenatal care as compared to women who attended ANC care early. This was a secondary hospital-based study and maternal morbidity might have been inflated; however the inflation is more likely to be non-differential between women

who did not attend antenatal care and women who attended, therefore resulting in underestimated magnitude of effect. [16]

A tertiary hospital-based study in Finland reported increased adverse events associated with lack of antenatal care and inadequate antenatal care. The study reported a higher percentage of delivery outside hospital in non-attenders (1.85%) and those who received inadequate ANC (0.97%) as compared to women who had adequate visits (0.09%). Delivery outside a facility increases the maternal mortality rate due to complications.[34]

Further, evidence from a study of Texan women suggested that those who did not attend or inadequately attended antenatal care were more likely to deliver by caesarean section (OR = 1.68; 95% CI 1.23 - 2.29 and OR = 1.5; 95% CI 1.06 - 2.12).[22]

2.3.2 Effects of Late Antenatal Care Attendance On Perinatal Mortality

According to Health System Trust (HST), perinatal mortality in South Africa was 37.5 per 1000 live births in 2006 which was higher than 6 per 1000 in developed countries, but lower than perinatal mortality rate of 30 - 200 per 1000 live births in other developing countries.[35] The South African Saving Babies Perinatal Care Survey of 2000 has reported a perinatal mortality rate of 18.5/ 1000 live births in Western Cape and 32.1/ 1000 live births in Gauteng. The survey attributed the high rate of perinatal deaths to lack or late initiation of antenatal attendance amongst other factors. Patient related avoidable factors were reported to be present in 35.9% of perinatal deaths. The most common patient related avoidable factors were no

antenatal care, late initiation of antenatal care or infrequent attendance at antenatal clinic (20%). [31]

In a French study, a high prevalence of preterm delivery (19% vs. 5% $p < 0.001$), low birth-weight (16.2% vs. 7.2%, $p < 0.001$) and admission to neonatal special care unit (26.3% vs. 11.2%) was reported in babies of women who attended ANC poorly (< 4 visits) as compared to women who attended ANC adequately (≥ 4 visits).[36] The findings are similar to a study by Raatikainen et al (2007), who reported significantly more low birth weight infants in under- and non-attenders (OR = 9.18; 95% CI 6.65 - 12.68 and OR = 5.46; 95% CI 3.90 - 7.65, respectively) more foetal deaths (OR = 12.05; 95% CI 5.95 - 24.40 and OR = 5.19; 95% CI 2.04 - 13.22 respectively) and more neonatal deaths (OR = 10.03; 95% CI 3.85 - 26.13 and OR = 8.66; 95% CI3.59 - 20.86, respectively).[34] The authors described this as a community based study, however patients were recruited when presenting for delivery, therefore making it a hospital based study. The magnitude of adverse outcomes in the infants might have been inflated as the recruitment was at a level two hospital, where mothers with complicated pregnancies are likely to deliver. The authors were not explicit as to the cause of adverse pregnancy outcomes such as preterm delivery, admission to neonatal ICU, foetal deaths or neonatal death. It could be assumed that causes of death due to unknown factors other than timing of ANC attendance would be equal in both groups, therefore and increased odds ratio indicate an excess risk attributable to late ANC.[34,36]

Jansone et al (2001) reported higher proportion of congenital syphilis (3.5% vs. 0.3; $p < 0.05$) and other infections (7% vs. 2.2%; $p < 0.05$) in babies born to mothers who did not attend antenatal care. [24]

2.4 Factors Associated with Late Antenatal Care Attendance

Factors associated with late antenatal attendance can be broadly categorised into ***health systems factors*** and ***patient factors***

2.4.1 Health System Factors

i) Health staff attitude

International studies

In the European study by Delvaux et al (2001) participants were also asked about "lack of quality of care" and two questions were asked to assess quality of care: atmosphere at the clinic and relationship with health care workers. Women who had inadequate antenatal care reported twice the likelihood of experiencing poor quality of care as indicated by staff attitudes (OR = 2.3; 95% CI 2.1-3.9).[15]

Regional and local studies

Studies in Nigeria and South Africa have shown that patients delay initiating antenatal care despite early diagnosis because of a lack of communication between providers and patients as to when to commence ANC and the importance of such care.[8, 11, 19] Health care worker's negative attitude towards multiparous women has resulted in delayed attendance of ANC in these group of women.[19] There is evidence from studies in Durban and Cape Town that suggests that at least a third of pregnancies presenting to the public sector may have been first confirmed in the private sector.[9-11] Private sector practitioners in South Africa have been reported as diagnosing pregnancies but not initiating antenatal care.[9, 11] Although it may be unrealistic to expect private general practitioners to initiate ANC, private general practitioners can facilitate early referral to public clinics for commencement of antenatal care. This

missed opportunity for early ANC initiation is possibly aggravated by lack of national antenatal cards in private sector. (Both private sector and public sectors use the National Road to Health Chart for child health immunisations and growth, but there are no similar patient-held records used for other conditions)

Jewkes et al (2001) explored reasons for late ANC attendance in Cape Town women, some women had experienced negative attitudes from the staff members and felt that the examination was disrespectful.[10] Although limited by lack of generalisability, the findings of this qualitative study are consistent with findings from other quantitative studies [9, 11, 19]

ii) Access to health services and service organisation

International studies

a. Health Service Barriers

A study to examine barriers to antenatal care amongst low income women in Texas found that women who attended ANC late were twice as likely to experience service barriers (OR = 1.7; 95% CI 1.01 - 2.97). [22] Service barriers in this study included lack of transport, long waiting, lack of child care, and lack of knowledge of where to access antenatal care, inability to get time from work, difficulty securing appointment, inconvenient clinic hours and cancellation of appointments at the clinic. Although the majority of patients reported not having a problem with most barriers, the most prevalent barrier was a lack of transport (11% of women). [22]

In the Ten European Countries study by Delvaux et al (2001), women who experience health service organisation barriers had 2.5 times odds of inadequately attending

antenatal care as compared to those who did not experience difficulties. Making appointments in advance was the most cited problem with health services organisation. Categories of service barriers examined in this study included participants' residential location relative to a health facility, waiting period, absence of walk-in centre and transportation difficulties. [15]

b. Financial Barriers

A US study found that uninsured women had 6 times the risk of not attending antenatal care as compared to women with national insurance ($p < 0.0001$) whereas women with private insurance were 1.7 times more likely to attend antenatal care early ($p < 0.00001$).[16]

Similar findings are evident in European research.[15] Lack of National Health Insurance in the first trimester increased the risk of inadequate prenatal care 30-fold, (OR = 30.1; 95% CI 20.1- 47). Having private insurance was protective against inadequate ANC (OR = 0.37; 95% CI 0.25 - 0.55). A higher percentage of women who had inadequate ANC reported having financial difficulties (7% vs. 3%), although the association was significant on univariate analysis, the adjusted association was non-significant on multivariate analysis (OR = 0.7; 95% CI 0.4-1.3).[15]A cross sectional study in Nigeria by Okunlola et al (2006) reported late attendance due to financial barriers in 9% of women and due to tight work schedule in 59% of women.[18]

Sunil et al (2008) found a non-significant association increase in late initiation of prenatal care in women who reported financial barriers (OR = 1.42; 95% CI 0.89 - 2.289).[22]

Regional and Local Studies

a. Health Services Barrier

In a qualitative study in Cape Town, [10] women reported that clinics (mainly in the townships) worked on a quota basis, as a result of which, sometimes when they arrive late, they would not be allowed in as the quota of the day would have been reached. Women reported that they needed to be at the clinic between 5am and 7am in order to be seen that day. Access in the township and suburban areas was generally different. Women in Southern suburbs were often seen quicker and generally arrived at the clinics after 8 am to be seen.[10]

According to South African National Primary Health care facility survey by Health System Trust in 2003, only 55% of clinics had antenatal care service every day, the urban provinces had lower proportion of clinics offering ANC as compared to the rural provinces.[37] Although a typical ANC consultation lasts 20 minutes, women often have to wait long hours to access care. Patients generally dread this waiting and try to minimise visits to the facility by attending ANC late.[10]

b. Financial Barriers

In South Africa, financial costs have not been explicitly reported as barriers for early ANC attendance. For example, Sibeko and Moodley (2006) reported that only 1.7% of women cited financial reasons for late attendance or non attendance of antenatal care. However, given that South Africa has implemented free health care for all pregnant women since 1994, the same authors pointed to financial barriers other than service fees, which are the indirect costs incurred by the patients such as transport,

loss of income due to taking time off work and the costs of extra child care to allow the mother to attend hospital. [9]

2.4.2 Patient's Factors

i) Socio-demographic factors

Age

In a hospital based cohort study, Raatikainen et al (2007) reported that women who do not attend ANC were more likely to be under 18 ($p < 0.01$).[34] Similarly French women younger than 18 years had almost 3 times odds of poor attendances (OR 2.8; 95% 95% CI 1.2-6.6) as compared to those between 18 and 20 years . When comparison was restricted to women above 20 years old, women who poorly attended ANC had 3.4 times the odds of being younger (< 24 years old).[34] This is confirmed in the data from a ten country European case control study where women younger than 20 years had increased risk of having inadequate antenatal care (OR = 2.6; 95% CI 1.8 - 3.875).[15]

Similarly, a Nigerian study reported that women who were younger than the age of 25 were more likely to attend late as compared to those older than the age of 25 (OR = 8.3; 95% CI 1.1 - 62.6).[19] The wide confidence interval means that the findings of the study are less precise, and this may be due to the small sample size used (479 participants). The authors were not explicit with the methodology and study methods, making it difficult to assess the type ad magnitude of bias associated with the study.

A number of studies had reported non-significant increased risks of attending ANC late in younger women as compared to older women. [9, 18, 22]

Ethnicity

Findings on association between late antenatal care attendance and ethnicity have been equivocal. Herbst et al, reported that Hispanic (RR = 3.2; $p < 0.0001$) and black African (RR = 1.2; $p < 0.001$) women were more likely to attend antenatal care late as compared to white Americans.[16] Another study in the USA reported that women from black and minority ethnic groups were more likely to attend late for antenatal care. The risk was increased three fold in Asians (OR = 2.7; 95% CI 1.04 - 7.03) and four fold in blacks (OR = 4.1; 95% CI 2.1-8.2).[38] However, a study on initiation of and barriers to prenatal care use among low-income women in San Antonio, Texas, found no significant difference in late initiation of prenatal care between Hispanic and non-Hispanic women (adjusted OR = 1.72; 95% CI 0.66-2.10). [22]

Other studies have reported associations between being a foreigner and late ANC attendance. Delvaux et al (2001) found an Odds Ratio of 3.8 (95% CI 2.8 - 5.1)[15] and Rowe et al (2008) reported a fourfold increase in late antenatal care attendance amongst women born outside the UK (OR = 4.4; 95% CI 2.2 - 8.5).[38]

Marital Status

Three studies have found association between marital status and late antenatal care attendance. Delvaux et al (2001) has reported increased odds of being unmarried in late antenatal attenders (OR=2.5; 95% CI 2.0 - 3.2).[15] Sunil et al has reported that women who attended antenatal care late had 2.4 times odds (95% CI 1.4 - 4.2) of being single.[22] In the UK based study, Rowe et al (2008) reported an increased odds

of late initiation of antenatal care that was higher for women living without a husband/partner (OR = 2.74; 95% CI 1.81 – 4.16). [38]

Education

Education of women has been frequently found to be associated with late antenatal care attendance. Sunil et al (2008) reported that women with middle school education or less, had 3.15 (95% CI 1.35 - 7.31) times the odds of late antenatal attendance as compared to women with college or beyond college education level. [22] Raatikainen et al (2007) reported that a high proportion of women who attended ANC adequately were more likely to be better educated than non-attenders or irregular attenders (24.7% vs. 18.5%; $p < 0.05$ & 24.7% vs. 16.43; $p < 0.001$ respectively). [34] Similarly, Delvaux et al (2001) compared women with primary education with those who have post graduate or secondary education; women with primary education had 3.8 odds (95% CI 2.8 - 5.1) of inadequate attendance of antenatal care as compared to women with secondary or post graduate education.[15] Adekanle and Isawumi (2008), in Nigeria, also reported on the association between late antenatal attendance and low level of education: women with primary or no education had 2.6 times (95% CI 1.28 - 5.38) the odds of attending ANC late. [19]

Other studies conducted in South Africa and Nigeria reported statistically non-significant association between low education level and late antenatal care attendance.[18, 20] The lack of statistical significance in these studies is most likely attributable to a lack of heterogeneity in education level amongst participants.

Income, employment and socio-economic class

Low income, poor socio-economic status and lack of employment have been associated with poor antenatal care attendance. For example, Delvaux et al (2001) reported that women with no regular income had 1.6 times odds (95% CI 1.2 - 2.1) of inadequate antenatal attendance as compared to women with regular income.[15]

McCaw-Binns et al (1995) found that women in the lowest 3 quartiles of weekly expenditures were more likely **not to attend** ANC (OR = 3.1; 95% CI 2.1 - 4.7) or if they did so, they attended late (OR = 1.7; 95% CI: 1.3-2.2). They also found that women from families where the major wage earner is in the lower class (OR = 2.2; 95% CI 2.1 - 3.6) or middle class professions (OR = 2.1; 95% CI 1.4 - 3.5) had increased risk for late antenatal care attendance as compared to women from families where the major wage earner is in a higher class profession. Unemployed women (OR = 1.6; 95% CI 1.1 - 2.2) and housewives (OR = 1.5; 95% CI: 1.1 - 2.0) were more likely to attend antenatal care late as compared to women in higher class professions.[17] Rowe et al (2008) reported similar findings in that women who never worked had an increased risk of attending ANC late as compared to women in professional or managerial jobs (OR = 2.83; 95% CI 1.07 - 7.43).[17, 38] Sunil et al (2008) reported a non-significant increase in late antenatal care attendance in women with no employment or low incomes.[22] The author studied a homogeneous group of women (all women were from low income class); this non-significant association could be explained by lack of heterogeneity.

Rural vs. urban residential area

McCaw-Binns et al (1995), reported an increased, but non-significant association between late antenatal care attendance and urban residence as compared to rural remote residence (OR = 1.2; 95% CI 0.8-2.6).[17]

ii) Previous obstetric history and health status

Parity

In the United States multiparity has been shown to be associated with late antenatal care attendance (OR = 1.2; $p < 0.0001$).[16] Blondel and Marshal (1998) reported a dose response relationship between parity and poor antenatal care attendance, with the odds of late ANC attendance being 1.5, 3.4, 9.6 and 34.9 respectively for women with 1, 2, 3 or ≥ 4 children.[36] This is consistent with findings reported by Jansone et al (2001) and Raatikainen et al (2007) who reported non-attenders to be multiparous rather than nulliparous.[24,34] Jansone et al (2001) reported that 30.5% multiparous vs. 7.7% nulliparous women ($p < 0.001$) and Raatikainen et al (2007) reported that 1.45% multiparous vs. 0.41% nulliparous women ($p < 0.01$) attended ANC late.[24,34] Similarly, Delvaux et al (2001) found that women with 4 or more children had a 3-fold increased likelihood of attending antenatal care late (OR = 3.0; 95% CI: 2.1 - 4.4).[15] Okunlola et al (2006) reported that nulliparous women were more likely to book early for ANC ($\chi^2 = 5.5$; $p = 0.02$).[18] The authors did not report the magnitude of the association.

Adekanle and Isawumi (2008) reported a non-significant association between parity and late ANC attendance.[19] They attributed this non-significant finding to the fact that nulliparous pregnant women were more likely to look for advice from multiparous

women, who were likely to advice them against early booking as pregnancy is not considered an illness.

Health status

Illness in the index pregnancy has been reported to promote early access to antenatal care. Okunlola et al (2006) reported that illness in the index pregnancy favours early antenatal care attendance. ($p = 0.003$). The authors did not report the magnitude of the associations and confidence intervals.[18]

Previous obstetric history

Previous bad obstetric history has been reported to promote early access to antenatal care. McCaw-Binns et al (1995) looked at the previous obstetric history of non-attenders, late attenders and early attenders.[17] A short inter pregnancy interval was associated with non- attendance for antenatal care. Women who had less than one year and between 1 and 2 years inter-pregnancy interval were more likely **not to attend** antenatal care as compared to women who had 2 or more years interval between pregnancies (OR = 3.1; 95% CI 1.6 - 6.2 & OR = 2.2; 95% CI 1.7 - 2.8 respectively.) An inter-pregnancy interval of 1 to 2 years was also associated with **late** antenatal attendance, (OR = 1.3; 95% CI 1.1 - 1.6). A previous history of miscarriage was protective against non-attendance (OR = 0.5; 95% CI 0.3 - 0.9) and late antenatal care (OR = 0.5; 95% CI 0.3 - 0.6). Similarly women with previous caesarean section were twice more likely to attend antenatal care early as compared to women with no previous caesarean section (OR = 1.8; 95% CI 1.1 - 2.9) and women who had previous forceps deliveries or other obstetric complications were more likely to attend early for antenatal care (OR = 2.3; 95% CI 1.2 - 4.5 & OR = 1.7; 95% CI: 1.3 - 2.3).[17]

In contrast, the differences reported by Raatikainen et al (2007) in the frequency of previous miscarriage, prior foetal death, previous induced abortion, hypertension and diabetes compared between poor attenders, non- ANC attenders and good ANC attenders were non-significant.[34] However, this study was conducted in a tertiary hospital and it is possible that women who attend there generally have high risk pregnancy therefore a more homogenous distribution of risk factors. Okunlola et al (2006) reported similar non-significant findings: previous history of caesarean section or previous obstetric complications had no influence on gestational age at first ANC attendance ($p = 0.91$ & $p = 0.79$ respectively).[18] The authors attributed these non-significant findings to lack of counselling in women who had caesarean and obstetric complications.

iii) Psychosocial barriers

Substance use

Studies have examined different forms of substance use as a risk factor for late antenatal care attendance. Raatikainen reported a higher proportion of alcohol drinkers in women attending ANC late.[34] In a retrospective record based study on perinatal deaths and antenatal care attendance in Latvia, Jansone et al (2001), reported a high proportion of non attenders to be smokers (28% vs. 3.2%, $p < 0.001$) and alcohol abusers (6.1 % vs. 0%; $p < 0.005$) as compared to women who attended ANC adequately.[24]

A Jamaican study reported increased risk of late antenatal care attendance in smokers (OR = 2.5; 95% CI 1.8 - 3.4). The history of smoking and antenatal history was taken

at delivery.[17] In a New Zealand study; the authors reported that 17% of pregnant women were smokers. Only 4% of women stopped smoking in pregnancy. Smoking mothers were more likely to attend for antenatal care late as compared to non-smoking mothers. (OR = 1.52; 95% CI 1.44-1.61).[39]

McCaw-Binns et al (1995) reported that consumption of alcohol was protective against non- attendance for antenatal care (OR = 0.7; 95% CI 0.5 - 0.9). However, the way alcohol was measured may have included social drinking, which may be strongly related to social class, as a result of which, this crude estimate may be confounded by socio-economic status. Further, as both exposures and outcomes were collected at delivery in this study, pregnancy may have resulted in reduction of drinking when attending ANC early therefore resulting in spurious (reverse) association.[17]

Sunil et al (2008) reported a non- significant association between smoking cigarettes and drinking during pregnancy and late initiation of antenatal care.[22]

Cultural and religious beliefs

Several studies have examined the influence of culture and religious on antenatal attendance.[15,38] In the study by Delvaux et al (2001) a culture index was created by asking the following questions: Problems with language, examination by men and husband prohibiting access to antenatal care. They found women with inadequate antenatal care were more likely to report cultural barriers as compared to women with adequate antenatal care. (OR = 3.0; 95% CI 2.3 - 3.9).[15] Rowe et al (2008) reported increased risk of late antenatal care attendance in women born outside UK (OR=4.37;

95% CI: 2.13-7.9). This difference highlights how cultural barriers can have effect on timing of antenatal care.[38]

Kone-Pefoyo and Rivard (2006) used a Ivory Coast national health survey for 1998 to determine the impact of poverty and socio-cultural factors on the use of maternal health services; they reported that patients who were religious were more likely to receive adequate antenatal care as compared to their non-religious counterparts (OR = 1.83; 95% CI 1.25-2.67).[40] A slightly different finding was reported in Zimbabwe, where women belonging to the Apostolic Faith group were more likely to attend ANC inadequately (< 4 times) as compared to other Christian groups, e.g. Catholic, Methodist and Protestant (OR = 2.9; 95% CI 1.3-6.4).[41] However, this was a crude odds ratio and the association may have been confounded by SES amongst other factors. Okunlola et al reported non-significant difference in ANC attendance status between Muslim and Christians (p = 0.62).[18]

Perceptions about pregnancy

Different perceptions such as an absence of medical problems, an absence of benefits from early antenatal care, ignorance of pregnancy, or perceptions about knowing what to do in pregnancy have been explored as possible reasons for late initiation of antenatal care.

Lack of a medical problem was reported by 28% of women who attended ANC late in study by Delvaux et al (2001) and 59% of women in the Nigerian study by Okunolola et al.[15, 18] Conversely, in a Cape Town study, by Jewkes et al (2001), women who attended early did so, because of medical reasons.[10]

Women tend to attend early when ANC is ***perceived to be beneficial***; 41% of women who attended ANC early in Nigeria, did so because of perceived benefits, while 10% of women in an European study attended late as ANC was perceived not to be worthwhile.[15, 17] Some of the cited reasons for late attendance reported by Delvaux et al include ***ignorance of pregnancy*** (26% of late attenders) and ***efforts to conceal pregnancy*** (9% of late attenders).[15] This concurs with the late antenatal care amongst unmarried and young women who are more likely to conceal pregnancy.[21,22]

In South Africa, Jewkes et al reported that Xhosa women believed that booking for antenatal care secures them a bed for delivery in hospital.[10] Myer and Harrison (2003) reported similar findings in Zulu women from rural KwaZulu-Natal; women believed that they needed to attend antenatal care only once and perceived that having antenatal card is more important than attending antenatal care earlier and regularly during pregnancy.[42] In both the studies the women did not perceive the benefits of attending antenatal care early and risks associated with non-attendance, however they perceived the benefits of delivering in the health care facility and hence booked early to secure a bed in the delivery unit.[10,42]

Planned Pregnancy

Delvaux et al found that women who had an unplanned pregnancy had 4 times odds of initiating antenatal care late (OR = 4; 95% CI 3.3 - 4.7).[15] McCaw-Binns et al (1995) in Jamaica reported similar findings with 3 times the odds (95% CI 1.6 - 4.7) of late antenatal attendance in women who had unplanned pregnancy.[17]

Sunil et al (2008), have reported that women who planned their pregnancy were more likely to attend ANC early.[22] These findings are similar to the findings of a qualitative study by Jewkes et al (2001), where women reported unwanted pregnancy as a reason for late antenatal care.[10]

iv) Partner characteristics

Little research has been conducted to explore characteristics of the partner that may influence timing of initiating antenatal care. Adekanle and Isawumi (2008) have reported that women whose partners are older than 25 years old are less likely to attend ANC late (78.9% vs. 91.9%, p = 0.003).[19] Okunlola et al (2006) reported no associations between husbands' occupation and late initiation of ANC.[18]

2.5 Efforts to Improve Early Access to Maternity Care

The literature search returned no studies on interventions to decrease late attendance of antenatal care. Few developed world countries have reported interventions to reduce late antenatal care attendance. Most of these interventions were not formally evaluated.

The following interventions have been implemented and suggested:

i) Use of existing community structures to implement individual-based high risk strategies

The World Bank advocated use of community structures to decrease maternal mortality.[43] In the UK a Maternity Access & Advocacy Pack was developed. This is a picture-based resource which aims to improve access to maternity services. [44] It is designed for use by community organizations prior to contact with health workers and is intended to reach pregnant women and influential individuals within communities,

both male and female. It was developed in close partnership with user groups from diverse ethnic communities and is driven by community non-health care workers with focus on women from marginalized groups. This is a high risk strategy as it focuses on high risk group. The pack is aligned with National Health System (NHS) child and maternal health improvement policies.

Lavender et al (2007) have recommended development and implementation of strategies directed at high risk women and suggested that the impact of strategies implemented on access to antennal care, maternal and perinatal mortality be evaluated. [45]

ii) Improving access to antenatal care , family planning and pregnancy testing

The World Bank advocated access to family planning, especially for adolescents, as a means to reduce unwanted pregnancy.[43] The World Bank recommends that National Departments of Health should implement local policies regarding access to antenatal care. These policies should include local specific protocols and monitoring and evaluation tools to monitor ANC coverage, early antenatal access and reduction in average number of visits per pregnant mother.[43] In South Africa, one way to improve access is to offer antenatal services daily instead of limited days, as recommended by the Health Systems Trust.[37] This is one example of what the World bank recommends as a reorganisation of antenatal services at a local area so that all women in the local area can access the service.[43] Another example is that outlined by Moodley and Morroni (2006) who proposed the use of pregnancy testing kits in PHC clinics, with immediate initiation of antenatal care after positive test.[7]

iii. Contextual strategies that may improve access to antenatal care

Addressing population related factors has been described by World Bank as means to reduce maternal mortality.[43] Some of the strategies mentioned included implementing policies that delay teenage pregnancies by increasing the age for marital consent. Improving socio-economic status of women through poverty reduction strategies, access to education and policies that encourage economical participation has also been mentioned. The recommendations have already being implemented in South Africa, i.e. maternal care guidelines have been implemented and the district health information system (DHIS) monitors ANC coverage, early ANC access using 20 weeks as cut-off, antenatal coverage and average no. of ANC visits per pregnant mother.

2.6 Summary of the Literature Review

Late antenatal care attendance is a problem worldwide. In developed countries between 24% and 36% of women attend ANC late, in South Africa and developing countries 68% to 91% of women attend ANC late. In South Africa ANC is considered early if initiated before 20 weeks of pregnancy. South African guidelines are similar to WHO guidelines and both recommend an average of 4 visits per low risk pregnant mother.

There are many reasons why attending ANC early is important: Early initiation of ANC is important to prevent and treat anaemia, to screen and treat hypertension, gestational diabetes, syphilis and other sexually transmitted illnesses. Early antenatal care allows women to access prophylactic treatment such as folic acid, which is important and needs to be taken in the first 3 months to prevent neural tube defects. Early HIV counselling and testing assists in identifying HIV positive women and

therefore early initiation of dual therapy for PMTCT or HAART in women with a CD4 count of < 250 cells/mm^3. On average women need to be on treatment for 10 weeks in order to achieve viral load suppression, therefore decreasing mother to child transmission rate. There are also possible benefits of breast feeding with minimal risk of transmission through breast milk, when mother's viral load is kept suppressed during feeding.

Early access to antenatal care facilitates early identification and treatment of diseases related to pregnancy that results in increased maternal mortality. In South Africa lack of antenatal care has been associated with 73% of maternal deaths. Lack of antenatal care has been associated with increased risk of pregnancy adverse events such as chorio-amnionitis, presenting in delivery unit in active phase of labour, delivery outside health facility and increased risk of caesarean section delivery.

Late ANC attendance has been associated with increased perinatal mortality rate. Babies of born to mothers who attended ANC poorly have an increased risk of preterm delivery, low birth weight, admission to special care unit and foetal/neonatal death. Babies born to mothers who did not attend ANC have an increased risk of congenital syphilis.

The factors associated with late antenatal booking can be broadly categorised as **health system factors** and **patient factors.**

Health system factors include access to the services and health care workers attitudes. The following barriers to access have been associated with poor access to antenatal services: lack of transport, indirect costs (e.g. time off work, money to pay

for child care), an inadequate appointment system (inability to get appointment on time), long waiting periods and inconvenient operating hours (clinics are open between 8 am and 4pm and working women may not be able to access care). Poor communication between health workers and patients and negative health care worker attitudes (such as disrespect and lack of empathy for multiparous women) has been associated with late antenatal care attendance. In South Africa, a considerable number of pregnancies are confirmed by private general practitioners but there are missed opportunities in referring pregnant women for antenatal care in the public sector. Strategies to facilitate easy referrals between general practitioners and local public clinics could be usefully implemented.

Patient factors associated with late antenatal care include: poor social-demographic profiles, psychological factors, past obstetric and medical history, cultural factors and partner's demographic characteristics.

Socio-demographic characteristics that increase risk of late antenatal care attendance include: young age at pregnancy, rural residence, low socio-economic status, and low level of education, low income, and minority ethnic group.

Past bad obstetric history such as previous miscarriage, has been reported to promote early access to antenatal care. Multiparous women with previous uneventful pregnancy are more likely to attend antenatal care late as they believe that they know what to expect.

Amongst the psychological factors, cigarette smoking has been found to increase risk of initiating antenatal care late, whilst desire for pregnancy reduced the risk for attending ANC late. Alcohol use has been reported by one study to protect against late

antenatal care, the methodology used in the study, may have resulted in a biased estimate.

Cultural barriers such as language, discomfort with male doctors, husband prohibiting and being a foreigner have been associated with late antenatal care attendance.
Non-religious women were more likely to attend ANC late; however, there were some intra-religious variations reported amongst different Christian faiths.

Few countries have developed strategies to reduce the prevalence of late antenatal care attendance. The strategies implemented and recommended includes population-based low risk strategies (e.g. poverty reduction, economic empowerment of women and increasing access to education) and individual-based high risk strategies, (education for adolescent, unemployed women and ethnic minority groups) and improving access to family planning and antenatal care.

3. MOTIVATION FOR THE STUDY

It is clear from the literature that late ANC attendance is a problem as indicated by the low percentage of women attending antenatal care below 20 weeks gestation age in South Africa. The effects of late antenatal care attendance are reflected in high perinatal and maternal mortality in South Africa. In order to improve early antenatal care attendance, women at risk as well as the risk factors amenable to intervention need to be identified. Most of the reviewed studies looking at risk factors for late ANC attendance were hospital-based and therefore prone to selection and response biases. Few community-based studies are available. Those that are available were conducted in Europe and inferring these findings to the South African context is difficult as the health care systems differ significantly. Only three South African studies were identified in literature: one qualitative study by Jewkes et al in 2001 and two hospital-based cross sectional studies by Sibeko et al in 2006 and Hoque et al in 2008.[9,10,11] As indicated previously the study by Sibeko et al did not compare the early and late antenatal care attendees.[9] The qualitative study by Jewkes et al had reported on the perceptions of the women and their own reasons for not attending; this study is qualitative in nature and limited by lack of generalisability.[10] The study by Hoque et al, was limited by the homogeneity of the sample.[11] As a result, there are gaps remaining in literature. Therefore, in order to characterise women at risk and to develop interventions to address late antenatal care attendance more local studies are required.

4. AIM AND OBJECTIVES OF THE STUDY

Aim: To identify risk factors for late antenatal attendance in a rural and urban site in South Africa.

Objectives:

To compare the demographic and psychosocial profiles of the urban and rural population

To describe and contrast pregnancy characteristics in rural and urban women

To determine and compare the prevalence of late attendance in a urban and rural area

To determine factors associated with late attendance in the rural and urban setting

5. METHODS

Data that was collected in 2006 to explore predictors of contraceptive use and alcohol consumption in a community survey of women of child-bearing age in one rural and one urban site was used.

5.1 Study Areas

The study areas comprised two comparison sites: a densely populated urban area in Gauteng province and a sparsely populated rural area of the Western Cape Province. The rural site was in the 3 West Coast district municipalities namely Bergrivier, Swartland and Cedarberg and is made up of multiple farm holdings (Figure 2). The West Coast covers a total area of 15,311 km^2 with a total population of 160,000. The West Coast borders the Atlantic Ocean o the West.[46, 47] In 2001, the proportion of rural house-holds in West Coast was reported as 39%. The racial makeup of the municipality is Black African 5.0%, Coloured 75.6%, Indian/Asian 0.1%, and White 19.2%.[46]

Only 18% of the population completed grade 12 and 6% had tertiary education. Thirty-one percent of population had secondary education but did not complete grade 12, 11% completed primary education, 23% had some primary education and 10% of population had no formal schooling. Agriculture and fishing are the dominant economic sectors in the region. The majority of workers (65%) were in non-skilled occupations. Most employment is found in agriculture and the fishing industry as these 2 sectors are the dominant economic sectors in the West Coast.[46]

The urban (Gauteng) site is located within the City of Tshwane Metropolitan Municipality and spreads over an area of 2,199km^2. It has a population of 1.98 million people.[46, 48] The urban site comprised of the contiguous North Eastern suburbs of Mamelodi, Eersterus and Moot (Figure 3)

Mamelodi was established in the 1950's and black people were relocated there in terms of the Group Areas Act. The population in Mamelodi is therefore mainly black, with an estimated population of one million. There are diverse types of housing in Mamelodi, ranging from well built brick houses to small informal dwellings made out of sheet metal known as shacks. On the whole the areas in the west mostly consist of brick houses and low cost Reconstruction and Development Programme (RDP) houses made out of large cement bricks. There are an increasing number of informal shack dwellings in the east of Mamelodi. Mamelodi has a mixed group of black people e.g. Nguni, Sotho, Shangaan and Venda speaking people. Eersterus was established in 1906, and was reserved for coloured population under the Group Areas Act of the previous apartheid regime. Moot consists of previously white suburbs just north of the Pretoria city centre, and includes suburbs such as Gezina, Waverly, Eastlynn and Queenswood.[48, 49]

The city of Tshwane is dense with a population of 1000 people per square kilometre.[48] The majority of the population in Tshwane have high school education (64%), 25% only achieved primary school education, and 11% had tertiary education. The metropolitan area is 97% urban and significantly industrialized.[46]

Figure 2: Map of District Municipalities of West Coast District[51]

Figure 3: Map of City of Tshwane Municipality[49]

5.2 Population Selection

The study population comprised women of child bearing age at risk for an alcohol-exposed pregnancy (AEP) – women in the age range of 18 to 44 years from urban Gauteng and rural Western Cape farms.

In the urban area, stratified random sampling was used, with a target of 820 women for the primary study. First, 82 census enumerator areas (EAs) were randomly selected; then ten households were selected randomly using aerial photographs to identify the households within selected EAs. One woman in each household was non-randomly selected.

In the rural site stratified cluster random sampling with a target of 650 women was used. Firstly the farms were chosen, within boundaries of the selected municipalities. Farms were randomly selected and all households within a cluster were sampled. Sample size calculations were based on precision estimated related to risk of alcohol exposed pregnancy (EAP).

5.3 Questionnaire

A structured questionnaire was used. It included items making up various scales for assessing the dependent variable (attending after 4 months for ANC) and independent variables. (See Appendix B)

Dependent Variable

Women were asked their gestational age at the time they first attended antenatal care during their last pregnancy. Women were categorised according to the gestational age at the time of their first antenatal visit into late attenders (score = 1) if the first attendance for antenatal care was after 4 months gestational age or early attenders (score = 0) if the first attendance for antenatal care was on or before 4 months gestational age. That is, the number of months was first collected as a continuous variable and converted into binary variable for analysis. Months instead of weeks were used in the original study as women were more likely to recall gestation age in months instead of weeks. Information on the number of antenatal visits during pregnancy was collected. The respondent's age at last delivery was collected and used to estimate the time interval since last pregnancy by comparing age at last delivery to age at the time of the study. Last pregnancy was defined as a pregnancy that was completed (with or without complications) and was estimated only for women who

had completed a pregnancy in the past. Any current pregnancies detected amongst the women were irrelevant for the purposes of estimating this particular interval. Women pregnant at the time of the study for the first time were therefore not included in this calculation.

All data on obstetric measures, including for women who were currently pregnant in the survey, were based on reports for their previous pregnancy.

Independent Variables

The independent variables consisted of (mostly binary) scales to assess variables within the following domains: (a) socio-demographic factors; (b) characteristics of index pregnancy including social substance use habits; (c) psycho-social factors; (d) community factors; and (e) partner characteristics.

a) Demographic variables: The demographic variables included the women's age, education, marital status, self-reported socially classified racial groupings (white, coloured, black/African and Indian), current employment status and socio-economic status (SES). (See Appendix B section 1)

***Age*:** Information about current age was collected as a numerical variable categorised into two age groups, with cut-off of 30 years.

Highest level of education was collected as a continuous variable and then dichotomised into grade 7 or lower (Score = 0), or education level above grade 7 (Score = 1) education.

Marital status was categorised as married (legally, traditionally or cohabiting) or unmarried.

Race**:** Participants were asked to self-identify according to the Apartheid defined racially classified social groups of "black/African", "coloured", "white", "Asian/Indian", and "other".

Unemployment was defined as those who reported no form of any employment (regardless of the duration or intensity). (See Appendix B section 2)

Socio-economic status: scores on eight items on the possession of specified assets and amenities (electricity, a radio, a television, a telephone, a fridge, a computer, a washing machine and a cellular phone), were summed to compute a socio-economic status (SES) score. These scores were then dichotomised such that those with five or more household assets were assigned a high SES score and those with less than five assets were assigned a low SES score. (See Appendix B section 3)

b) Information on current or last pregnancy

Social Habits during index pregnancy (See Appendix B section 15)

Alcohol drinking habits in the last 3 months during this pregnancy were categorised into non-drinkers (score = 0) and drinkers (score = 1). Women were asked if they intended to stop drinking alcohol during pregnancy; all the women who answered the question (yes or no) were categorised as drinkers prior to pregnancy and women who

responded non-applicable to the question regarding intentions to stop drinking during pregnancy were assumed to be non-drinkers and categorised as such.

Smoking status prior to pregnancy was categorized into smokers (score = 1) and non-smokers (score = 0). Women were asked if they intended to stop smoking or not; all the women who answered the question were categorised as smokers prior to pregnancy and women who responded non-applicable to the question regarding intentions to stop smoking during pregnancy were assumed to be non-smokers and categorised as such.

c) Information on the index pregnancy (See Appendix B Section 14)

Age at birth of last child (index pregnancy) was categorised into < 30yrs (score = 0), and ≥ 30 yrs (score = 1).

Desirability of pregnancy was scored 1 to 4, with 1 showing a high desire to have the baby and 4 no desire at all to have the baby. Desire to have a child in index pregnancy was categorised into high desire (score = 1) if a score was 1, or low desire (score = 0) if score was 2 to 4.

Miscarriage: Information on previous miscarriage was collected. A score of 1 was assigned to women reporting miscarriage and a score of 0 was assigned to women with no history of miscarriage.

Site of antenatal care: information on type of facility used in majority of times was collected. Information was dichotomise as private (score = 0), for women seeking

ANC mainly from private sector or public (score = 1) for women receiving care mainly in public sector. Private sector facilities included private hospital and private midwife. Public sector services included public hospitals, public clinics and public surgery.

Place of delivery: Categorical information regarding place of delivery was collected.

Caesarean section: women were asked information on caesarean section. (No = 0, Yes = 1, not applicable = 3)

Outcome of pregnancy: information on the outcome of the last pregnancy was collected related to the following: full term birth, pre-term birth, still-born, voluntary termination of pregnancy and miscarriage.

Complications in Pregnancy: this was self-reported - women were asked if the last pregnancy had any complications. Answers were categorised into yes (score = 1) or no (score = 0).

Parity: the number of live children that the women had given birth to was dichotomised as more than one child versus one or no children. (Of 15 women, who reported not having children, 14 were currently pregnant with first child and 1 had a previous miscarriage). Nulliparous and primigravid women were assigned a score of one and multiparous women were assigned a score of 0

d) Community factors

Cultural factors: Male entitlement to have children and value of women regardless of parity was assessed. Four questions were used to identify male entitlement. Each question was scored on a rank of 1 to 4 (See Appendix B Section 13), a lower score indicating strong agreement with a pro-male culture. Scores were summed and participants were categorised as coming from a paternalistic cultural background if the score fall on or below the 75th centile and from a non-paternalistic culture if the score was above the 75th centile.

Community Domain (Social Capital): On a one-item scale (See Appendix B Section 4), those who strongly or moderately agreed that the people in their neighbourhood can be trusted were assigned a score of "1", while those who neither agreed nor disagreed, or moderately disagreed, or strongly disagreed were assigned a score of "0". Those with a score of 1 were categorised as coming from high social capital areas, and those with a score of 0 from a low social capital area.

Social support: Scores on the 14 item social support scale were summed and dichotomised, across the 75th percentile as high versus low social support. (See Appendix B Section 12)

e) Psychological factors

Self-esteem: Scores on the ten-item self-esteem scale (Rosenberg, 1965) were summed and dichotomised, across the 75th percentile as high versus low self-esteem. (See Appendix B Section 5)

Religious orientation: Five questions were asked on religious orientation of the participants, and scored on a Likert scale of 1-5. The scores were summed and dichotomised across 75th centile as religious (score=1) and non religious (score =0). (See Appendix B Section 18)

Partner Characteristics during index pregnancy

Socio-Demographic information, alcohol use and information on whether the partner was the father of the pregnancy were collected. (See Appendix B Section 16)

Socio-demographic information: Age of the partner at the time of pregnancy was categorised into binary variable around 30 years. Partners who were younger than the age of 30 (score = 0) and those who were 30yrs old and above were categorised as older partners (score = 1). The education of the partner was categorised around grade 10 (standard 8), with those with education below grade 10 categorised as low level of education (score = 0) and those with grade 10 education or above categorised as high level of education level (score = 1). Information on employment was collected, a score of 0 was assigned if a partner was unemployed and a score of 1 was assigned if the partner was employed. Information on the type of occupation was also collected. Information on whether the partner was the father of pregnancy was collected. If the partner was the father of the child, this was scored as 1 and, if not, this was scored as 2. If the mother was single, this variable was scored as 0.

Use of alcohol: A variable for alcohol drinking was created for partners who reported that they are drinking, regardless of intensity of alcohol consumption. Partners who consumed alcohol were given a score of 1 and non-drinkers a score of 0.

Procedure

The field workers had face-to-face interviews with women who consented to participating in the primary study. The primary study was approved by ethics committees of Universities of Pretoria and Cape Town.

5.4 Statistical Analyses

Descriptive data analysis

STATA 8 was used for all analyses. Shapiro-Wilk tests were used to determine normality of the (continuous) data, means and standard deviations were used to describe normal continuous data; medians and ranges were used to describe non-normal data. For comparison purposes, the Wilcoxon rank sum test was used to compare non-normal continuous data and t-tests were used for normally distributed continuous data. Frequency tables were used to describe categorical data. Pearson Chi-square tests were used to test for significant associations. A Pearson's correlation was used to examine relationships between continuous variables.

Multivariate Analysis

Since the two samples used in the study were vastly different, stratified analysis was conducted separating the West Coast and Gauteng study sites (See Tables 2 - 6). Logistic regression models were developed separately for rural and urban women. For the urban site, variables that were significantly associated with late attendance on bivariate analysis were added individually to a baseline empty model. At each step, models were compared and extra variables added on the best model. Aikake's

Information Criterion (AIC) was used to select the best model. Since the rural sample had no significant predictors on bivariate analysis, a forward selection procedure was used to create a model using a p-value = 0.2 for inclusion.

Standardised residuals, linear predictor (xb), Pregibon leverage (hat matrix) and deviance residuals were predicted for both the models. The linear predictability of the model was determined by creating a scatter plot of residuals versus xb (linear predictors). Influence was determined using the predicted Pregibon leverage in Stata, and the observations with high leverage value were considered to be influential. Observations with a value more than 2*p/n were considered to be influential, where p equals the number of observation and n the number of covariate patterns. Outlying observations were identified by standardised residuals greater than +2 or less than -2. It was decided not to remove the outliers from the analysis as they were addressed by use of non-parametric method in bivariate analysis.

6. RESULTS

Completed questionnaires were received from 83% (412/492) of the rural women approached to participate in the study and 74% (606/820) of the urban women. A total of 216 women (21% of responding women) were excluded from analysis as they were never pregnant. These women were eligible for the original study, but not this study. The exclusion criteria resulted in a total of 802 subjects available for analysis (61% of the original responders sample size), 354 women were from rural area and 448 were from urban area. The median age of the participants was 32 and ranged from 18 - 44. The majority of participants (65%) had more than 1 child. The median gestation age of first attendance of antenatal care was 4 months (range 0 – 9; IQR 3 - 5)

Descriptive Analysis Results

Demographic comparison of the two populations (Table 2)

The median age for rural participants was 31.7 and 32.5 respectively for rural and urban participants respectively. The difference between the ages of these participants was statistically non-significant ($p = 0.17$). The sample from the rural area consisted mainly of coloured people (90.7% versus 82.3% black people in urban townships ($\chi^2 = 434.3$; $p < 0.001$). Urban people were better educated (90.4% were educated beyond grade 7 in urban areas vs. 38.0% in rural areas; $\chi^2 = 216.0$; $p < 0.001$) and had higher socio-economic status (SES) (45.1% reported 5 or more possessions in urban areas compared to 25.4 % in rural areas; $\chi^2 = 31.5$; $p < 0.001$) but were less likely to be employed (45.4% in urban areas compared to 81.4% in rural areas; $\chi^2 = 125.2$; $p < 0.001$). Amongst the urban women, women who were employed reported high SES (OR = 5.4; 95% CI 3.4 - 8.4) as compared to the unemployed. In the rural area, women's employment status was not associated with the socioeconomic status (OR =

1.13; 95% CI 0.58 - 2.31). Rural women were more likely to be married as compared to urban women (68.6% vs. 56.3%; χ^2=49.5 $p < 0.001$). Virtually all women in rural areas were employed as farm workers (Table 2).

Psychosocial Description of Rural and Urban Women (Table 3)

The rural farm population differed significantly from urban population in terms of psychosocial predictors (Table 3). The rural women reported more low self-esteem (74.0% vs. 55.0%; $\chi^2 = 199.1$; $p < 0.001$), higher levels of high social capital (45.2% vs. 26.8%; $\chi^2 = 22.5$; $p < 0.001$) and were less religious (77.4% vs. 83.7%; $\chi^2 = 5.1$; $p < 0.001$). More rural women reported that they were smoking cigarettes (58.4% vs. 11.0%; $\chi^2 = 198.2$; $p < 0.001$) and drinking alcohol (41.6% vs. 10.5%; $\chi^2 = 100.7$; $p < 0.001$) as compared to urban women. There was no difference in social support between the rural and urban women (26.2% vs. 24.4%; $\chi^2 = 0.1$; $p = 0.61$). More rural women had desired to be pregnant as compared to urban women (62.1% vs. 45.3%; $\chi^2 = 23.1$; $p < 0.001$). (See Table 3)

Table 2: Demographic Characteristics of Participants

	Rural		Urban		χ^2	P- Value
	N	%	N	%		
Age	***N = 354***		***N = 448***		***0.12***	***0.737***
≤ 30 years	146	41.2%	190	42.4%		
> 30 years	208	58.8%	258	57.6%		
Year of schooling	***N = 353***		***N = 447***		***216.0***	***< 0.001***
≤ Grade 7	219	62.0%	43	9.6%		
> Grade 7	134	38.0%	404	90.4%		
Marital status	***N = 354***		***N = 448***		***49.5***	***< 0.001***
Unmarried	111	31.4%	196	43.8%		
Married	243	68.6%	252	56.3%		
Ethnicity	***N = 354***		***N = 447***		***434.3***	***< 0.001***
Black/African	29	8.2%	368	82.3%		
Coloured	321	90.7%	52	11.6%		
White	3	0.8%	26	5.8%		
Asian/Indian	0	0.0%	1	0.2%		
Other	1	0.3%	0	0.0%		
Current employment status	***N = 354***		***N = 447***		***125.2***	***< 0.001***
Unemployed	66	18.6%	244	54.6%		
Employed	288	81.4%	203	45.4%		
Socio-economic status	***N = 354***		***N = 448***		***31.5***	***< 0.001***
Low (< 5 possessions)	264	74.6%	246	54.9%		
High (≥ 5 possessions)	90	25.4%	202	45.1%		

Table 3: Psychosocial Characteristics of Participants

	Rural		Urban		χ^2	P- Value
	N	%	N	%		
Self esteem	***N = 342***		***N = 433***		***199.1***	***< 0.001***
Low	254	74.0%	238	55.0%		
High	89	26.0%	195	45.0%		
Social Capital	***N = 354***		***N = 448***		***22.5***	***< 0.001***
Low	194	54.8%	328	73.2%		
High	160	45.2%	120	26.8%		
Religion	***N = 354***		***N = 448***		***5.1***	***< 0.001***
Non Religious	80	22.6%	73	16.3%		
Religious	274	77.4%	375	83.7%		
Smoking	***N = 353***		***N = 428***		***198.2***	***< 0.001***
No	147	41.6%	381	89.0%		
Yes	206	58.4%	47	11.0%		
Drinkers	***N = 353***		***N = 427***		***100.7***	***< 0.001***
No	206	58.4%	382	89.5%		
Yes	147	41.6%	45	10.5%		
Social support	***N = 343***		***N = 438***		***0.1***	***0.61***
Low	255	73.8%	331	75.6%		
High	90	26.2%	107	24.4%		
Desire to be pregnant	***N = 354***		***N = 446***		***23.1***	***<0.001***
No	134	37.9%	244	54.7%		
Yes	220	62.1%	202	45.3%		

Descriptive Factors of the Index Pregnancy

On average the participant's median number of children was 2 with a range of 0 - 8. Fourteen women were pregnant with the first child and one woman had one pregnancy which resulted in miscarriage. There was no difference in median number of children between rural and urban women (Wilcoxon rank-sum p = 0.7) The age range of respondents' index pregnancy was 18 - 44 in both areas and the median age of index pregnancy for women in rural province was slightly lower than that of urban women (26 vs. 27; p = 0.048). A total of 13 (4%) women in rural area vs. 28 (6%) women in urban area were pregnant at time of interview (χ^2 = 2.09; p = 0.09).

Amongst the women who were **not** pregnant at the time of the study, the majority of them had the last pregnancy more than 2 years before the study period. (See Table 4)

Table 4: Time Interval since Last Pregnancy amongst Rural and Urban Participants*

Time between last pregnancy and study period	Rural (N = 340)		Urban (N = 414)	
	N	%	N	%
In the past year	42	12%	74	22%
1-2 years	42	12%	47	14%
2-3 years	45	13%	55	16%
3-4 years	37	11%	32	9%
4-5 years	23	7%	35	10%
> 5 years	151	44%	171	50%

* Denominator includes only women with a past pregnancy; current pregnancy not counted for estimating interval

A total of 91 (25.7%) rural women vs. 146 (32.6%) of urban women had attended after 4 months of gestational age ($\chi^2 = 4.5$; $p = 0.034$). The median number of ANC visits in rural women was 5.7 and in urban women 6.7 ($p < 0.001$). The gestational age at first visit for antenatal care ranged from 1 to 9 months in both groups. The median gestational age at first ANC attendance was 3.78 for rural area and 3.81 months for urban area. The difference in gestational age at ANC attendance between the two groups was not statistically significant ($p = 0.2$). However, when dichotomising gestational age into binary variable, before or after 4 months gestational age, there was a difference between areas.

Although the vast majority of women in both sites relied on the public sector for ANC and delivery services, a higher proportion of urban women used private services as their main care provider during pregnancy than rural women (16.3% vs. 4.2%; $\chi^2 = 29.5$; $p < 0.001$). More urban than rural women, reported delivering in private sector

(14.7% vs. 2.9%; $\chi^2 = 30.7$; $p < 0.001$). In the urban sample, women who attended private sector for ANC were more likely to have a caesarean section as compared to women who attended ANC in public sector (42% vs. 20%; $\chi^2 = 16.4$; $p < 0.001$). Although the caesarean section rate was higher in rural women attending private care as compared to those attending public sector, it was not statistically significant (23% vs. 13%; $\chi^2 = 2.7$; $p = 0.1$). (See Table 5)

Women with one child or who were ever pregnant once were more likely to be 30 years old or younger (45% vs. 6%; $\chi^2 = 163.7$; $p < 0.0001$). A higher proportion of women in rural area reported index pregnancy at age ≤ 30 years (76.2% vs. 69.1%; $\chi^2 = 4.9$; $p = 0.027$) as compared to women in urban area.

Table 5: Descriptive Factors of Index Pregnancy in Rural and Urban Women

	Rural		Urban		χ^2	P- Value
	N	%	N	%		
Timing of first ANC	***N = 354***		***N = 448***		***4.5***	***0.034***
Early (< 4months)	263	74.3%	302	67.4%		
Late (>4 months)	91	25.7%	146	32.6%		
Pregnancy Outcomes	***N = 352***		***N = 446***			
Full term	310	88.1%	394	88.3%	0.0	0.87
Pre-term (premature)	30	8.5%	35	7.8%	0.1	0.73
Still born	0	0.0%	7	1.6%	5.6	0.02
Voluntarily termination	1	0.3%	1	0.2%	0.0	0.87
Miscarriage	11	3.1%	9	2.0%	1.0	0.32
Complications at Birth	***N = 343***		***N = 444***		***2.0***	***0.16***
Yes	299	87.2%	371	83.6%		
No	44	12.8%	73	16.4%		
Caesarean Section	***N = 342***		***N = 440***		***11.1***	***0.01***
Yes	47	13.7%	102	23.2%		
No	295	86.3	338	76.8%		
Age at index pregnancy	***N = 341***		***N = 447***		***4.9***	***0.027***
≤ 30 Years	260	76.2%	309	69.1%		
> 30 Years	81	23.8%	138	30.9%		
Previous Miscarriage	***N = 353***		***N = 445***		***0.00***	***0.98***
No	275	77.9%	347	78.0%		
Yes	78	22.1%	98	22.0%		
Main provider of ANC	***N = 354***		***N = 447***		***29.5***	***< 0.001***
Public sector	339	95.8%	374	83.7%		
Private sector	15	4.2%	73	16.3%		
Place of delivery	***N = 339***		***N = 442***			***< 0.001***
Home	17	5.0%	15	3.4%	1.1	0.296
Government Hospital	268	79.1%	323	73.1%	3.3	0.071
Day hospital/clinic/ CHC	44	13.0%	39	8.8%	3.4	0.065
Private hospital/clinic	10	2.9%	65	14.7%	30.7	< 0.001

Partners' Characteristics

The majority of the women in both the rural and urban areas were in a relationship with the father of the unborn child during the index pregnancy (91.8% and 90.6% respectively; $\chi^2 = 0.63$; $p = 0.43$). Of the women who were not with the father of the child during index pregnancy, 53 (7%) women were single (23 (6%) in rural area and

30 (7%) in urban area), whilst 16 (2%) women were with someone other than the father of the pregnancy (4 (1%) in rural and 12 (3%) in urban).

Partners of women in the rural area differed from partners in the urban area. They were significantly younger (51.1 % younger than 30 years vs. 33.7%; $\chi^2 = 24.7$; $p < 0.001$), mostly employed (92.7% vs. 73.8 $\chi^2 = 44.5$; $p < 0.001$) and less likely to be educated up to grade 10 and beyond (22.5% vs. 81.8%; $\chi^2 = 233.5$; $p < 0.001$). A higher proportion of partners in the rural area consumed alcohol as compared to partners in the rural area, (64.7% vs. 53.8%; $\chi^2 = 9.67$; $p = 0.02$). (See Table 6)

Table 6: Comparison of Partner Characteristics between Rural and Urban Women

	Rural		Urban		χ^2	P-value
	N	%	N	%		
Age	***N = 353***		***N = 448***		***24.7***	***< 0.001***
< 30	181	51.1%	151	33.7%		
≥ 30	172	48.9%	297	66.3%		
Education	***N = 285***		***N = 380***		***233.5***	***< 0.001***
< Grade 10	221	77.5%	69	18.2%		
≥ Grade 10	64	22.5%	311	81.8%		
Abusive Partner	***N = 326***		***N = 413***		***0.17***	***0.684***
Yes	112	34.4%	136	32.4%		
No	214	65.6%	277	67.6%		
Employment	***N = 328***		***N = 416***		***44.5***	***< 0.001***
No	24	7.3%	109	26.2%		
Yes	304	92.7%	307	73.8%		
Drinking Partner	***N = 354***		***N = 448***		***9.67***	***0.002***
No	125	35.3%	207	46.2%		
Yes	229	64.7%	241	53.8%		
Father of the pregnancy	***N = 354***		***N = 446***		***0.63***	***0.43***
No	29	8.2%	42	9.4%		
Yes	325	91.8%	404	90.6%		

Bivariate Analysis Results

Demographic Predictors of Late ANC Attendance

Table 7 shows the univariate demographic predictors of late ANC attendance in each area. No significant statistical association between demographic characteristics and late ANC attending was observed amongst rural women.

Urban women who were older than the age of 30 at the time of the study were less likely to initiate antenatal care later than 4 months as compared to women who were 30 years old or less (OR = 0.45; 95% CI 0.3 - 0.69). Similarly, urban women who were older than the age of 30 at the time of index pregnancy were also less likely to initiate ANC later than 4 months as compared to those who were 30 years old and younger (OR = 0.61; 95% CI: 0.39 - 0.98). That is, being in an older age group either currently, or at the time of the index pregnancy, appears protective against late initiation of ANC. In the urban area, high socio-economic status (OR = 0.41; 95% CI: 0.26 - 0.64), marriage (OR = 0.61; 95% CI 0.39 - 0.93), previous miscarriage (OR = 0.33; 95% CI 0.17 - 0.61) and receiving care in private sector (OR = 0.31; 95% CI 0.14 - 0.63) were all significantly associated with reduced risks for late ANC attendance. Women with 0 - 1 child had a significant increased risk of late-attendance (OR = 1.89; 95% CI 1.24 - 2.91).

Education level (categorical variable) was not associated with late antenatal care attendance in both rural and urban women. Gestational age was regressed against education level, both variables in a continuous form, the association was non-significant (p = 0.21). Similarly, employment status was not associated with late ANC attendance.

Table 7: Socio-demographic Factors Associated with Late ANC Attendance (unadjusted)

	Rural		Urban	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Age group				
Age > 30 vs. age ≤ 30	0.914	(0.55 - 1.53)	0.45	(0.30 - 0.69)
Age at index pregnancy				
Age > 30 vs. age ≤ 30	1.06	(0.59 - 1.87)	0.61	(0.39 - 0.98)
High SES	0.69	(0.36 - 1.26)	0.41	(0.26 - 0.64)
High social Capital	0.68	(0.32 - 1.34)	1.17	(0.73 - 1.81)
Parity				
0-1 vs. ≥ 2	1.23	(0.72 - 2.07)	1.89	(1.24 - 2.91)
Miscarriage	0.01	(0.54 - 1.84)	0.33	(0.17-0.61)
Ethnicity				
Black vs. non-Black	0.912	(0.32 - 2.31)	1.78	(0.99 - 3.34)
Married vs. unmarried	0.65	(0.38 - 1.11)	0.61	(0.39 - 0.93)
Private vs. public	1.47	(0.38 - 4.86)	0.31	(0.14 - 0.63)
Employment vs. unemployment	1.22	(0.63 - 2.47)	0.85	(0.56 - 1.39)
Education > grade 7 vs. ≤ grade 7	1.045	(0.62-1.77)	0.68	(0.30 - 1.45)

Psychosocial Predictors of Late ANC Attendance

There were no significant associations between psychosocial predictors and late ANC attendance amongst rural women. (See Table 8)

The association between late ANC attendance and psychosocial variables such as smoking, drinking alcohol or social support was non-significant in urban women as well, however the desire to be pregnant was protective of late ANC attendance (OR = 0.56; 95% CI 0.39-0.75) (Table 9). This means that women who wanted to become pregnant were twice as likely to attend ANC early.

There was no association between gestational age and the following variables: self esteem (p = 0.76), social support (p = 0.79) and religiosity (p = 0.16), when the

independent variable scores in continuous form were correlated against gestational age in continuous form.

Table 8: Psychosocial Factors Associated with of Late ANC attendance (unadjusted)

	Rural		Urban	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Drinker vs. Non-drinker	1.61	(0.86-272)	0.8	(0.37-1.64)
Smoker vs. Non-smoker	1.31	(0.77- 2.25)	0.67	(0.37-1.63)
High vs. low self-esteem	0.87	(0.15.-3.51)	0.91	(0.90 -2.271)
High vs. low social support	0.81	(0.43-1.58)	1.57	(0.49-1.35)
Paternalistic vs. Non-paternalistic culture	1.08	(0.43-1.45)	0.88	(0.54-1.40)
Religious vs. Non-Religious	0.85	(0.78-3.15)	1.57	(0.90-2.71)
Desire vs. no desire to be pregnant	0.67	(0.40-1.14)	0.56	(0.39-0.77)

Partners' Characteristics Associated with Late ANC Attendance (Table 9)

None of the partner's characteristics was associated with late ANC attending amongst rural women. In the urban area, women whose partners' were less educated had twice the odds of late attendance compared to those whose partners had higher level of education OR = 2.24; 95% CI 1.14 - 4.66). Employment of the partner decreased the risk of late attending for antenatal care by 39% (OR = 0.61; 95% CI 0.38 - 0.99).

Table 9: Partners' Characteristics associated with Late ANC Attendance (unadjusted)

	Rural		Urban	
	OR	95% CI	OR	95% CI
Age > 30yrs vs. ≤ 30 years	0.98	(0.59-1.66)	0.73	(0.47-1.13)
Education < Grade 10 vs. ≥ grade 10	0.93	(0.45-1.88)	2.24	(1.14-4.66)
Employment vs. unemployment	0.99	(0.36-3.18)	0.61	(0.38-0.99)
Drinker vs. non- drinker	0.87	(0.51-1.48)	0.83	(0.54-1.26)
Partner Father vs. not father of pregnancy	0.74	(0.29-2.06)	0.61	(0.30-1.23)
Abusive vs. non-abusive partnership	0.94	(0.54-1.68)	0.1	(0.62-1.60)

Multivariate Analysis

Logistic regression was computed separately for rural and urban samples as they were vastly different.

Rural Area

The univariate associations observed amongst rural women were non-significant. The multilevel model building starting with significant univariate associations was thus not applicable. The forward stepwise selection procedure (using inclusion p-value of 0.2) yielded a model, in which maternal drinking was the only predictive variable of late antenatal care. There was a non-significant association between late antenatal care booking and maternal drinking (OR = 1.3; 95% CI 0.8-2.1; p = 0.34).

Urban Area

From a multilevel model building a final model was selected by comparing AIC. Initially all variables that were significant on bivariate analysis were included in the model, these included: ***age at index pregnancy, socio-economic status, parity, miscarriage, marital status, main site for ANC, desire to be pregnant, partner education and partner employment.*** From the model with variables that were significant in bivariate analysis, individual variables that were not significant on univariate analysis were included logically if thought to be confounders. For example,

maternal smoking and maternal drinking were added at the model as they may confound association between late antenatal care and miscarriage. Partner age was included as it is related with education level, employment and late antenatal attendance. Eventually 17 models were created (see Appendix A, for STATA output of model building). A final model with the lowest AIC of 398 was selected. The model (presented in Table 10) included the following variables: age at index pregnancy, socio-economic status, parity, miscarriage, marital status, main site for ANC, desire to be pregnant, partner education, partner employment and maternal drinking status. Although mothers current age was significantly associated with late antenatal care booking on bivariate analysis, the models with current maternal age yielded a model with high AIC. (See appendix A for model building).

A plot of residuals versus linear predictors has indicated that the form of this model is adequate. Also the Pearson goodness of fit test indicated that there was no significant difference between the predicted model and observed model (p = 0.23). Observations were to be considered influential if they had a leverage of > 4 (calculated as 2 x p/n = 2 x 352/157) (see Figure 3). None of the observations were influential.

Standardised residual plot indicated that only 12 observations were outliers (with standardised residual > 2 or < -2) for various reasons (Figure 4). It was decided not to exclude outliers as non-parametric analysis was used in univariate analysis (i.e. outliers have been addressed by non-parametric methods).

High socio-economic status (OR = 0.41, 95% CI: 0.24 - 0.71), previous miscarriage (OR = 0.36; 95% CI 0.18 - 0.73), private sector utilisation (OR = 0.43; 95% CI 0.19 -

0.99), desire to be pregnant (OR = 0.6; 95% CI 0.36 - 1.00) and having employed partner (OR = 0.57; 95% CI 0.32 - 1.0) were significantly protective of late ANC attendance, whilst having a partner with low education (OR = 2.92; 95% CI 1.38 - 6.16), and first pregnancy/ only 1 child (OR = 1.98; 95% CI 1.11-3.53) were associated with increased risk of late ANC attendance. Marriage and older maternal age (> 30) at index pregnancy which were significantly protective against late ANC attendance on univariate analysis had non-significant association with late ANC attendance on multivariate analysis. The association between late attendance and maternal alcohol consumption remained non-significant. (See Table 10)

Multivariate analysis was repeated using svy command to adjust for clustering effect by census enumerator area, the magnitude of the effects remained the same; there was no change in the significance of any associations but narrower confidence intervals (data not presented).

Table 10: Logistic Regression of Predictors of Late ANC Attendance amongst Urban Women

Late antenatal care attendance	Odds Ratio	P-value	95% CI
High vs. low SES	0.41	0.00	0.24 - 0.71
Parity			
0-1 vs. ≥ 2	1.98	0.02	1.11 - 3.53
Miscarriage vs. no miscarriage	0.36	0.01	0.18 - 0.73
Married vs. unmarried	1.12	0.68	0.65 - 1.93
Private sector vs. public sector	0.43	0.05	0.19 - 0.99
Desire vs. no desire to be pregnant	0.60	0.05	0.36 - 1.00
Partner Education			
< Grade 10 vs. ≥ Grade 10	2.92	0.01	1.38 - 6.16
Partner employment			
Employed vs. unemployed	0.57	0.05	0.32 - 1.00
Age at index pregnancy			
Age > 30 vs. age ≤ 30	1.41	0.28	0.75 - 2.65
Maternal drinking vs. non-drinking	1.53	0.32	0.66 - 3.52

Figure 4: Residuals vs. xb (Leverage)

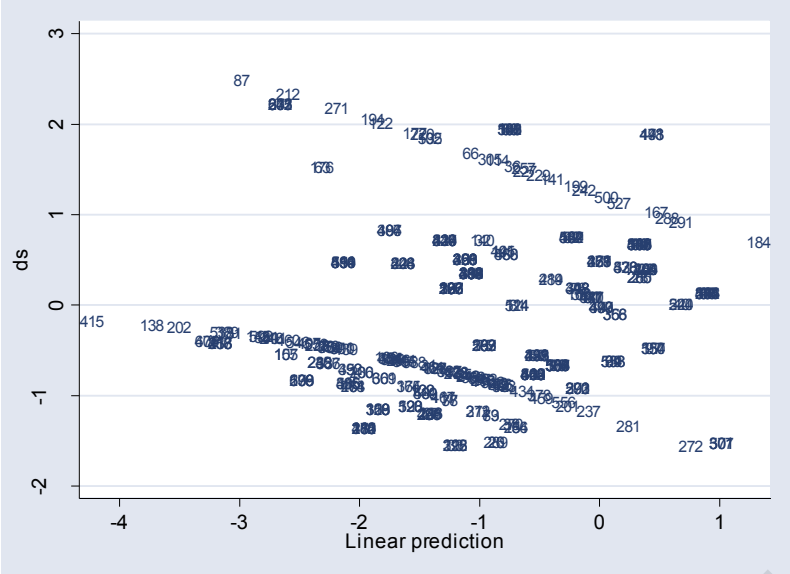
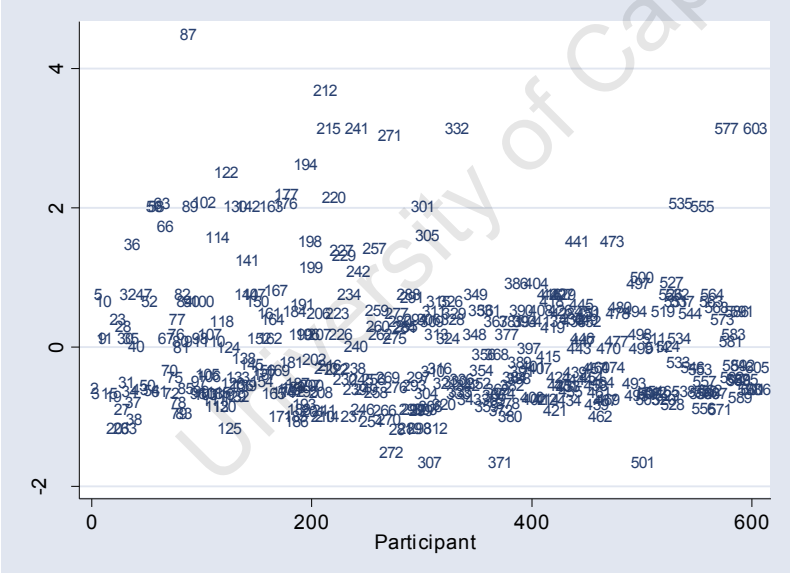


Figure 5: Standardised Pearson's Residuals vs. Participants



7. DISCUSSION

Comparison of Rural and Urban Women

The two samples differed significantly with regards to the demographic, socio-economic and psychosocial profiles. The rural population of Western Cape was predominately coloured and the urban site was mainly black. The racial differences can be attributed to the Group Areas Act, were people of similar origins were forced to reside in a particular area. Urban people were better educated as compared to rural population. This agrees with STATS SA 2001 census by district which reported that 31% of population in West Coast district from where the rural participants were sampled, had attained primary education as compared to 75% in City of Tshwane municipality from where urban participants were sampled.[48] Although there was a statistical difference in the median age of rural and urban participants, this difference is not clinically significant 27 vs. 28 years; $p = 0.048$). The significant difference can be attributable to large power of the study.

Women in the urban areas reported better household social economic status as compared to rural women, but rural women were more likely to be employed. This agrees with South African Population Census 2001 that reported better socio-economic status in urban areas; mainly attributable to available job opportunities.[48] Incomes of urban people are also higher than incomes of rural people. Rural people in the study were more likely to be employed; however, most of them were employed in the farming sector where income is low and where residence on a farm is usually contingent on working for the farm owner. For example, the Department of Labour in SA recommends a minimum salary of R989.00 in rural areas and R 1041.00 in urban areas.[51]

Rural women were more likely to smoke and drink as compared to urban women. The rural areas comprised largely of Coloured people who generally have higher smoking and alcohol consumption prevalence as compared to African people.[12] The high prevalence of alcohol consumption in Western Cape can be attributed to historical practice of the "dop" system according to which farm workers were remunerated with alcohol. Although no longer widely practiced, it is well recognised that the "dop" system has left a legacy of high rates of alcohol misuse and dependence.[53]

Rural women reported significantly higher levels of social capital than urban women (Table 3). This is comprehensible as farm communities are small and people are more likely to know each other. The farm population is made up of people from similar cultural background; in this case Afrikaans speaking Cape Coloureds, who are likely to have similar interests, whilst urban township is made up of diverse cultural and ethnic groups (e.g. Tswana, Venda, Pedi Shangaan, English, and Afrikaans etc.) who are more likely to have diverse interests.

Rural women have reported more desire to get pregnant than urban women. Since rural women were more likely to be married or cohabit, it is possible that being in stable relationship made them want to have children. There is also a possibility that being married, these women were more likely to desire pregnancy in order to please their partners.

Male partners of rural women were less educated and more likely to be employed, again a feature of the socio-economic landscape of agricultural employment patterns

in the Western Cape. The socio-demographic characteristics of rural men matched characteristics of their spouses. The findings concur with South African Population Census 2001 findings. The male partners in rural area were more likely to consume alcohol as compared to male partners in urban area. The drinking pattern can also be attributed to the "dop" system explained above.[53]

Prevalence of Late Antenatal Attendance

The prevalence of the late-attendance in the two populations was 29%, 26% percent of rural women attended antenatal care late as compared to 32% of urban women. The infrequent attendance can be attributable to poor access to health services. The proportion of women attending late for antenatal care is lower than other studies in the similar setting. The 2003 SADHS reported late attendance (after 4 months) of 71%, Hoque in a rural KZN district reported that 91% of women attended ANC later than first trimester and Sibeko et al in Durban reported that almost 50% of women attended ANC later than 20 weeks of pregnancy (4.5-5months). [7-12] The prevalence of late antenatal care attendance in this study almost similar to the prevalence in the first world country, where late ANC attendance was reported to be between 24% and 36%.[14-17] The underestimated proportion of late attendance could be due to errors in recall as most of the women had their pregnancy more than 2 years before the study. This may have resulted from non-differential misclassification of gestational age at first ANC attendance. The high proportion of early antenatal care attendance may also be attributable to responder bias; it is possible that participants are aware of unacceptability of late antenatal care, and may have opted to report an earlier gestation age at booking.

Gestation age was collected in months instead of weeks, a cut off of 4 months was used, this may have resulted in non-differential misclassification of women, particularly in women with gestational age of more than 16 weeks but less than 20 weeks could have reported their gestational age as anything from 3 months to 5 months. If women were only 17 weeks pregnant women can either report being 4 months or 5 months pregnant, if they report themselves at 4 months they would have been misclassified as early attenders. This misclassification is more likely to be non-differential between urban and rural participants.

The rural population had a lower prevalence of late attendance as compared to urban population (26% vs. 32%, p = 0.03). This finding is inconsistent with the 2003 SADHS which reported that 68% of urban women attended ANC late as compared to 73% of rural women.[12] Hoque et al (2008), reported 91% late ANC attendance in rural women of KwaZulu-Natal using first trimester (12 weeks) cut off[11], whilst Sibeko and Moodley (2006)(focused on an urban population in the same province and reported 50% late antenatal care attendance (using 20 weeks cut-off).[9] The divergence from previous literature in this study group population could be due the "captive" nature of health care for farm populations when mobile services are used, i.e. the service goes to the people and people find it easier to attend – barriers to health care such as transport and time off work are minimized when services such as antenatal care are delivered at community level. Also farmers' wives might have further promoted health care amongst farm women by educating them about family planning and access to antenatal care. Low prevalence of late attendance of antenatal care in the rural sample may also be explained by the contextual effects of better services in the Western Cape. According to HST 2006 DHIS data, 92% of women in Western Cape

delivered in facility vs. 79% in Gauteng Province.[54] Western Cape has a better health personnel per population as compared to Gauteng province (e.g. 38 vs.32 doctors per 100 000 people and 267 vs. 242 nurses per 100 000 people).[55] The above mentioned indicators suggest that Western Cape health services are better supplied with human resources as compared to Gauteng health services.

Although rural women attended earlier, they attended fewer visits as compared to urban women. This finding need to be viewed with caution as most of the women were pregnant more than 2 years ago and may therefore be less likely to recall the correct number of ANC visits.

Utilisation of the private sector in the urban population can be attributed to the availability of private general practitioners in urban areas. The high level of caesarean section rate can be attributed to utilisation of private services, where generally caesarean section rate has been reported to be higher than in public sector.[56, 57]

Predictors of Late Antenatal Care Attendance

Rural women

There were no significant associations between the demographic factors, psychological, partner's characteristics and late antenatal care attendance amongst rural women. This may be the result of the way the sample was selected. Cluster sampling may have resulted in the sample being rather homogenous for these variables, and hence the null association. Also, the dependence of farm residents on the farm owners for access to services off the farm is a common feature of the Western Cape farm environment.[53] Antenatal care may be one form of service which

is relatively simple for farm owners to facilitate, unlike other services, such as, for example, services for curative care.

Urban women

Positive Findings:

Age at index pregnancy: in the univariate analysis, women older than 30 years at index pregnancy were less likely to attend ANC late as compared to women 30 years old and younger. This is consistent with unadjusted findings by Adekanle and Isawumi (2008).[19] After controlling for other factors such as SES, parity and partner's characteristics, the association between young age and late ANC booking became non-significant. Older women are more likely to have more than one child; the observed association on univariate analysis could be due to confounding effects of parity. The adjusted results differ from findings of Delvaux et al (2001) and Raaitikainen (2007): after adjusting for confounding factors Delvaux et al (2001) and Raaitikainen et al (2007) reported an increased risk of late antenatal care attendance amongst young women. However, both Delvaux and Raaitikainen included much younger women in their studies and defined the cut-off for young women as ≤ 20 years and < 18 years, respectively. In this study, none of the respondents were currently younger than 18 years, so the distribution of age at the time of previous pregnancy was similar, with few women in the lowest categories. As a result, for purposes of achieving sufficient power, a cut-off of 30 years was used to dichotomise age, which could explain the non-significant association. There was a lack of an age gradient in this study to demonstrate the effect of age in the lower age range found by Delvaux and Raaitikainen.

Socio-economic status: Women with high socio-economic status were 59% less likely to attend late for antenatal care. McCaw-Binns et al and Delvaux et al reported similar findings.[15, 17] The effect remained the same after controlling for confounding variables. The findings are plausible as access to health care for antenatal care, although free, requires a woman to have funds for indirect costs such as transport. Women of low social class, if employed, may work in jobs that are less autonomous and therefore; may be unable to request time off from work, despite being lawfully entitled to do so. Better SES also allows access to private health care which is easier to access as compared to public services. Although the association is strong and biologically plausible, lack of temporality demonstrated within these data, may limit the causal inference

Marriage/ living with a partner: Although marriage was significantly protective for late antenatal care on bivariate analysis, the effect fell away on multivariate analysis. This is in contrast with other studies that reported that living with a partner is protective for late antenatal care attendance.[15, 21, 22] In South Africa, marriage may be more strongly associated with SES (and perhaps use of private health care, through access to a married partner's health insurance) than in other countries, so adjusting for the confounding effect of SES and utilisation of private sector could have resulted in the different adjusted effect as compared to the crude effect in this study.

Utilising **private sector** as a main service provider: women who used private sector were more likely to attend early for antenatal care. After multivariate analysis the strength of association decreased but still remained significant. Controlling for SES may have resulted in over controlling for confounding variables as SES may operate

as a predecessor for private health care. Although there are no studies which compared early access between private and public institutions Delvaux et al has reported early antenatal care attendance in women who had private insurance.[15]Generally, in South Africa, private health care is easily accessible for those who have financial means, and barriers usually found in government services such long waiting and negative staff attitudes are minimal.

Desire to be pregnant: Women who wanted to be pregnant attended early for antenatal care. The findings are similar to Delvaux et al (2001), McCaw-Binns et al (1995) and Sunil et al (2008) reported similar findings in women; they reported that women who had planned pregnancy were more likely to attend early for antenatal care.[15, 17, 22]

Parity: Nulliparous and primiparous (those with 0-1 child) women were more likely to attend late for antenatal care as compared to multiparous women (with more than 2 children). This is in contrast to findings by a number of other studies.[15, 16, 19, 24, 34] The association between late antenatal attendance and first pregnancy in this study may be due to the effort of pregnant mothers to conceal pregnancy until later stages or lack of knowledge; women pregnant for the first time may self-diagnose pregnancy late and therefore, may attend late for antenatal care. Although women who had one child and those who were pregnant for the first time were more likely to be younger ($p < 0.001$), the risk of attending ANC late remained after adjusting for age at index pregnancy.

Previous Miscarriage: Previous miscarriage was protective of against late attendance of antenatal care. Women who had previous miscarriage were 66% (95% CI 27% -

82%) less likely to attend late for antenatal care. The findings agreed with McCaw-Binns who reported that women who had a previous bad obstetric history such as forceps delivery, miscarriage and caesarean section are more likely to attend antenatal care early.[11] The findings are psychologically plausible; when a pregnancy has been previously threatened or resulted in complications, women are more likely to attend ANC early in an effort to ensure that the pregnancy is uneventful. The protective effect of previous miscarriage against late antenatal care attendance in this study is relatively strong as the risk of late antenatal booking is reduced by more than 50%.

Partners' characteristics: On univariate analysis, the age of the partner had no effect on antenatal care attendance. However Adekanle and Isawumi (2008) found that women whose partner's are older are more likely to attend antenatal care late.[13] After controlling for women's socio-economic status in multivariate analysis, women whose partners were educated up to and beyond grade 10 were 3 times more likely to attend early for antenatal care as compared to women whose partners were educated below grade 10. In univariate analysis, the employment of the partner reduced the risk of late antenatal care attendance. However the magnitude of the protective association reduced after multivariate analysis. The findings are plausible as better educated partners may be able to understand and encourage women to attend early for antenatal care and when a partner is employed the women's SES will improve.

Negative findings:

There were no associations for late antenatal care attendance in the rural population. As outlined above, this was probably because of the homogeneity of the sample. In the urban area, there was a null association between mother's employment and late

ANC attendance. This may have arisen because information was collected on current employment, rather than information at index pregnancy. It is possible that, since their last pregnancy, women might have found employment. For example, teenagers may have dropped out of school and found employment after school. However, the converse is also likely – teenagers may go back to school after delivering their baby, and older women may have lost employment (if in unskilled labour due to unfair dismissal) and struggled to find work subsequently because of high national unemployment rates or may have elected to stay at home to look after the child. These factors may have resulted in substantial misclassification of employment status.

The association between education and late ANC was non-significant. This can be explained by lack of variation in education level amongst urban women.

Transformation of continuous data into categorical variables for cross tabulation in contingency tables may also result in a loss of detail and precision that might affect measures of association between variables. In other words, the reduction in variability in the transformed categorical variables can reduce the power to assess relationships. In order to exclude the possibility that the null association was due to this transformation, a sensitivity analysis was conducted to determine if there was a correlation between the timing of antenatal care and independent variables as continuous data such as religiosity, social capital self esteem, social support and education level using Pearson's correlation coefficients. However, none of these analyses generated any significant associations of these independent variables with late antenatal care attendance. (Results not presented but available on request).

8. LIMITATIONS OF THE STUDY

The study used the sampling strategy that was developed purposefully to include women at risk of alcohol exposed pregnancy. The cluster sampling in Western Cape resulted in null associations due to homogeneity of the sample. The study is limited by lack of temporality between socio-economic status, partner employment, education level of partner, marital status and late antenatal care attendance. Although lack of temporality limit causal inference relating these variables to late antenatal care, this limitation does not affect the validity of the significant association between miscarriage, desire to be pregnant and late antenatal care attendance as these independent variables occurred before pregnancy.

Recall bias of gestational age at booking has been discussed above as a possible limitation of this study. Whilst crude effects such as booking or not being booked may be correct, other fine details such as number of antenatal visits need to be interpreted with caution. Months instead of weeks were used for gestational age. This could have resulted in non-differential misclassification of gestational age through rounding off of gestational age, which could have resulted in either underestimation or overestimation of gestational age.

The aggregated findings have limited generalisability to other populations in South Africa. The urban province sample demographics are similar to that of a typical South African urban area in Gauteng; it consisted of mixed racial groups, with majority of participants being black. The study findings may be indicative of what could be found in other urban centres of South Africa but because of differences in population composition and the fact that the site was not chosen randomly, the results cannot be

said to be fully representative of such areas. The rural sample demographics reflect those of the Western Cape rural population. The findings cannot be generalised to other farm population except those in Western Cape.

9. CONCLUSION

This study confirmed that late antenatal care attendance in South Africa is prevalent, and interventions are required to improve early access to ANC in order to reduce perinatal and maternal mortality associated with late ANC attendance.

Compared to the rural sample, urban women had better socio-economic profiles and reported more positive psychosocial factors. A higher proportion of urban women attended antenatal care late as compared to rural women. The factors associated with late initiation of antenatal care amongst urban women include low partner education and primigravidity/nulliparity (being pregnant for the first time and having only one child). Factors that favoured early access to antenatal care amongst urban women include high socio-economic status, a partner being employed, desire to be pregnant and having a previous history of miscarriage. No significant associations were identified amongst rural women with late initiation of antenatal care.

10. RECOMMENDATIONS

The study has generated a hypothesis about possible factors associated with late antenatal care attendance. Although the study is limited by lack of temporality, most of the findings are biologically plausible and consistent with the previous literature. There is a need for more local studies that would be less susceptible to bias and have stronger temporal associations to confirm or refute these findings.

The study reports both population wide (contextual) and individual specific factors associated with late antenatal care. Contextual factors identified include low socio-economic status, lower level of partner education and unemployed partner. Utilisation of private services is generally determined by socio-economic status rather than by personal choices. Individual factors associated with late antenatal care attendance include desire to be pregnant, miscarriage and first index pregnancy (women who were pregnant for first time, or women who had only one child).

In order to promote early access to antenatal care, strategies described by Rose et al in 1985, can be applied: population based low risk strategies for contextual factors and individual high risk strategies for individual factors.[58]

Population-based low risk strategies to improve early access of antenatal care:

These strategies are applied at a population level using national policies. Population based interventions are radical and often result in major impacts, which may not only improve access to antenatal care but may generally improve the health status of the population. The interventions are usually multi-departmental efforts and not necessarily restricted to Department of Health. These interventions do not require

individual motivation. The following population based low risk strategies can be implemented for findings in this study.

i. Lower socio-economic status

The problem of poverty in South Africa is a general challenge that affects health status broadly. To impact on antenatal care, policies to improve women's socio-economic status should be explored. These include use of social grants, job creation strategies and legislative changes. Reliance on welfare measures alone, such as the child support grant, appears insufficient to address the challenge of improving women's socio-economic status and emphasises the need for job creation programmes targeting women. Generally, in South Africa, unemployment is a national crisis requiring national inputs. Previous gender disparities have created employment opportunity gaps between men and women. The Employment Equity Act and related Affirmative Action policies which aim to address employment disparities are not adequately addressing unemployment and women's low socio-economic status as unemployment is a national crisis regardless of gender.

Lack of skilled labour indicated that labour market in South Africa is shifting from unskilled to skilled. Strategies to improve job creation needs create opportunities for skilled labour for women and improve access and quality of primary and high school education, and access to post high school education.

ii. Lower partner education and partner unemployment

A comprehensive national strategy discussed above is likely to address low level of education in male partners and may address unemployment.

iii. Private sector vs. public sector

Use of the private sector was associated with early access to antenatal care attendance; this means that attending public sector services was associated with late ANC attendance. Although ANC in government facilities is free, some of the factors that discourage women from attending public health services include negative staff attitudes, long waiting hours, difficulty securing appointments and lack of daily ANC services in the Primary Health Care facilities.

Addressing factors that are associated with negative staff attitude such as staff shortages, high turnover, implementing task shifting, offering health care workers platforms for debriefing and capacitating health managers to be able to manage, support and mentor their subordinates will help in addressing some of the health care workers negative attitudes. Improving efficiency of Department Human Resource departments will address most of the issues associated with inefficiency in recruiting and retain staff members.

A second strategy would be to ensure that ANC services are rendered daily and promoting that ANC is initiated immediately after diagnosing pregnancy so as to facilitate early access to antenatal care. Spreading patients flow in the clinic will ensure that patients don't wait for longer periods (e.g. Patients generally present early to the clinic and may start waiting from as early as 5 am, most of the clinics are empty

after lunch time). For return visits patients residing closer to the clinic and returning for appointments can be booked for afternoon to improve patient flow and relieve congestion in the morning. Patients residing outside clinic catchment generally attend early as transport is scarce during the day. Improvements to the appointment system may therefore help substantially to address the problem.

A third strategy may be to intervene with private practitioners. This study indicates that women attending private care generally attend early. Only 11.0 % of the South African Population is on Medical Aid which would allow them a full package of antenatal care. Sibeko et al, have reported that 49% of late antenatal care attenders and 60% of women of women who did not attend antenatal care at all, had confirmed their pregnancy in private sector. Private General Practitioners could therefore be provided with and trained on use of ANC cards (similar to Road to Health Cards, which are being provided to both private and government facilities). Training on national guidelines on maternity care should be extended to private General Practitioners to ensure that patients who pay out of pocket, choosing to use both government and private sector, are followed up according to the standardised national guideline, and that there is a continuity of care when patients opt to use either public or private sector or a combination of the two sectors. General Practitioners should also be encouraged to refer women to government facilities immediately if women are unable to afford a full package of private health care. General Practitioners can provide the ANC card to women diagnosed of pregnancy immediately after confirmation and where possible they may initiate maternity care up to a certain level (e.g. on diagnosing pregnancy, a general practitioner can issue a maternity card and screen for hypertension and do a general clinical assessment, where after the patient

may then be referred to government to continue care and do necessary blood tests). Current discussions to establish a National Health Insurance may also help to address the differences between private and public health care by establishing a single payer system with easier movement between public and private sectors and so improve early attendance for ANC. This insurance may improve early access to ANC by improving access private primary health care, therefore reducing overcrowding and waiting times in public facilities.

Lastly, implementing national campaigns using relevant and popular media (e.g. radio, television or billboards) to promote awareness of the benefits of early antenatal attendance and risk of late antenatal attendance might assist with decreasing the prevalence of late antenatal care booking.

Individual risk strategies

Strategies aimed at a high risk population involve interventions focused on high risk individuals, which are cost effective but require individual motivation.

There were 3 individual level associations for antenatal care attendance: **Desire to be pregnant** and **previous miscarriage** were protective against late antenatal care attendance, whilst **being pregnant for the first time** was associated with late antenatal care attendance.

i. **Desire to be pregnant**

Wanting a pregnancy was associated with early antenatal care attendance. This suggests that educating women of child bearing age about planned parenthood may help to improve early antenatal attendance. Younger women (who are less likely to

desire pregnancy) need to be encouraged to delay age of onset of intercourse; this will also contribute to reducing the prevalence of teenage pregnancy, another major reproductive health challenge. All women of child bearing age need to be educated about the availability and types of birth control methods. Double protection with condom use needs to be emphasised as most women are not empowered to negotiate condom use; however, most women can often autonomously use contraceptive without the knowledge and consent from the spouse or partner.

Improving access to family planning, by ensuring that clinics offer daily services and integrating family planning in general poly-clinics will ensure that women attending health services for reasons other than family planning are educated about family planning and are offered an opportunity to take up the service if they do not want a child. In the Western Cape, the health department supplies private pharmacies and private PHC services with contraceptives, and patients only pay R10 to R20 for administration. This measure assists with coverage and convenience, especially for working class women with low income, who cannot afford to take a day off to attend government clinics for contraceptives. Such public-private partnerships could be expanded. Further, the cheaper access to contraceptive can also be taken up to by people who are on medical aids as most medical aid companies do not cover the costs of contraceptives.

ii. <u>Previous miscarriage</u>

Women with previous miscarriage seem to be motivated to attend antenatal care early. Educating women on consequences of attending antenatal care late may assist in motivating some women to attend early. Women who have other forms of pregnancy

complications may also benefit from vigorous education and counselling to attend early at their next pregnancy. In addition, department policies can help women who have had pregnancy complications to become educators of other women to attend early for antenatal care by recruiting them as peer educators.

iii. Being pregnant for the first time

Women who are pregnant for the first time are likely to be young. Improving access to family planning services and health promotion interventions to encourage a delay in first intercourse may prevent women from getting pregnant. Public education about safe pregnancy using public media and health facility-based education about the advantages of early ANC attendance and the dangers associated with late ANC attendance may assist with increasing awareness on early access to ANC. Addressing health system barriers to early ANC care should also aim to facilitate early access to ANC post diagnosis.

The challenges are large but the opportunities to address factors associated with late antenatal care attendance are possible.

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Appendix A

Model Building For urban women

```
------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
------------------------------------------------------------------------------

. est store A

. logistic lateb agegr

Logistic regression                               Number of obs   =        448
                                                  LR chi2(1)      =      15.07
                                                  Prob > chi2     =     0.0001
Log likelihood = -275.25647                       Pseudo R2       =     0.0266

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |    .453208    .092975    -3.86   0.000      .303162    .6775172
------------------------------------------------------------------------------

. est store B

. est stats

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df        AIC          BIC
-------------+----------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225

------------------------------------------------------------------------------

. logistic lateb agegr ses

Logistic regression                               Number of obs   =        441
                                                  LR chi2(2)      =      29.12
                                                  Prob > chi2     =     0.0000
Log likelihood = -263.28962                       Pseudo R2       =     0.0524

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .4900759   .1032631    -3.38   0.001      .324271    .7406596
         ses |   .4365796   .0956199    -3.78   0.000     .2842057    .6706472
------------------------------------------------------------------------------

. est store C

. logistic lateb agegr ses parity

Logistic regression                               Number of obs   =        441
                                                  LR chi2(3)      =      32.77
                                                  Prob > chi2     =     0.0000
Log likelihood = -261.46507                       Pseudo R2       =     0.0590

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .5894737   .1363336    -2.29   0.022     .3746263    .9275354
         ses |   .4231435   .0932837    -3.90   0.000     .2746862    .6518364
      parity |   .9055844   .0486138    -1.85   0.065     .8151443    1.006059
------------------------------------------------------------------------------

. est store

. lrtest C D, stats

likelihood-ratio test                             LR chi2(1)  =      3.65
(Assumption: C nested in D)                       Prob > chi2 =    0.0561
```

```
------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.4651      4     530.9301    547.2863
------------------------------------------------------------------------------

. drop _est_D

. logistic lateb agegr ses parity1

Logistic regression                               Number of obs   =        441
                                                  LR chi2(3)      =      32.53
                                                  Prob > chi2     =     0.0000
Log likelihood = -261.58419                       Pseudo R2       =     0.0585

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .5925277    .139005    -2.23   0.026     .3741274     .938421
         ses |   .4304655   .0947706    -3.83   0.000     .2796013    .6627314
     parity1 |    1.55293   .3691275     1.85   0.064     .9745938     2.47446
------------------------------------------------------------------------------

. est store D

. lrtest C D, stats

likelihood-ratio test                                 LR chi2(1)  =      3.41
(Assumption: C nested in D)                           Prob > chi2 =    0.0648

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
------------------------------------------------------------------------------

. logistic lateb agegr ses parity1 misc

Logistic regression                               Number of obs   =        438
                                                  LR chi2(4)      =      43.85
                                                  Prob > chi2     =     0.0000
Log likelihood = -253.27132                       Pseudo R2       =     0.0797

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .6449378   .1550834    -1.82   0.068     .4025647    1.033237
         ses |   .4480261   .1006018    -3.58   0.000     .2885165    .6957223
     parity1 |   1.558073   .3791123     1.82   0.068     .9671023    2.510171
 miscarriage |   .3655798   .1138439    -3.23   0.001     .1985695    .6730569
------------------------------------------------------------------------------

. est store E

. lrtest  D E, stats
observations differ: 438 vs. 441

. est stats

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
           E |    438   -275.1983   -253.2713      5     516.5426    536.9537
           F |
------------------------------------------------------------------------------

. logistic lateb agegr ses parity1 misc marr

Logistic regression                               Number of obs   =        438
                                                  LR chi2(5)      =      45.93
                                                  Prob > chi2     =     0.0000
```

```
Log likelihood = -252.23541                     Pseudo R2       =     0.0834

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .6704612   .1628414    -1.65   0.100     .4165183    1.079228
         ses |   .4492998   .1011594    -3.55   0.000     .2889942    .6985274
     parity1 |   1.437916   .3599976     1.45   0.147     .8802908    2.348772
 miscarriage |   .3578973   .1119138    -3.29   0.001     .1939052     .660583
     married |   .7171621   .1659607    -1.44   0.151     .4556572    1.128747
------------------------------------------------------------------------------

. est store F

. est stats

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
           E |    438   -275.1983   -253.2713      5     516.5426    536.9537
           F |    438   -275.1983   -252.2354      6     516.4708    540.9641
------------------------------------------------------------------------------

. logistic lateb agegr ses parity1 misc marr site

Logistic regression                             Number of obs   =        437
                                                LR chi2(6)      =      50.84
                                                Prob > chi2     =     0.0000
Log likelihood = -249.38984                     Pseudo R2       =     0.0925

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .6904966   .1692381    -1.51   0.131     .4271056    1.116318
         ses |   .5245649   .1226532    -2.76   0.006     .3317204    .8295189
     parity1 |   1.475041   .3731229     1.54   0.124     .8984342     2.42171
 miscarriage |   .3563227   .1117399    -3.29   0.001     .1927142    .6588298
     married |   .7758109    .182258    -1.08   0.280     .4895383     1.22949
        site |   .4454254   .1705382    -2.11   0.035     .2103192    .9433459
------------------------------------------------------------------------------

. est store G

. est stats

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
           E |    438   -275.1983   -253.2713      5     516.5426    536.9537
           F |    438   -275.1983   -252.2354      6     516.4708    540.9641
           G |    437   -274.8093   -249.3898      7     512.7797    541.3392
------------------------------------------------------------------------------

logistic lateb agegr ses parity1 misc marr site desire

Logistic regression                             Number of obs   =        437
                                                LR chi2(7)      =      54.71
                                                Prob > chi2     =     0.0000
Log likelihood = -247.45284                     Pseudo R2       =     0.0995
```

latebooking	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
agegroup	.7155178	.176579	-1.36	0.175	.44112	1.160604
ses	.5345232	.1257414	-2.66	0.008	.3370774	.8476244
parity1	1.486075	.3777062	1.56	0.119	.9030177	2.445599
miscarriage	.3842907	.1217281	-3.02	0.003	.2065536	.7149685
married	.8259728	.1968523	-0.80	0.422	.517727	1.317743
site	.4510832	.1733434	-2.07	0.038	.2124001	.9579847
desire	.6394395	.1459354	-1.96	0.050	.4088226	1.000147

```
. est store H

. est stats
```

Model	nobs	ll(null)	ll(model)	df	AIC	BIC
A	448	-282.7918	-282.7918	1	567.5837	571.6885
B	448	-282.7918	-275.2565	2	554.5129	562.7225
C	441	-277.8481	-263.2896	3	532.5792	544.8464
D	441	-277.8481	-261.5842	4	531.1684	547.5246
E	438	-275.1983	-253.2713	5	516.5426	536.9537
F	438	-275.1983	-252.2354	6	516.4708	540.9641
G	437	-274.8093	-249.3898	7	512.7797	541.3392
H	437	-274.8093	-247.4528	8	510.9057	543.5452

```
. logistic lateb agegr ses parity1 misc marr site desire partnered

Logistic regression                             Number of obs   =        371
                                                LR chi2(8)      =      57.68
                                                Prob > chi2     =     0.0000
Log likelihood = -200.83775                     Pseudo R2       =     0.1256
```

latebooking	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
agegroup	.9334141	.2692164	-0.24	0.811	.5303588	1.642778
ses	.418326	.1103253	-3.30	0.001	.249475	.7014596
parity1	1.781903	.5219024	1.97	0.049	1.003634	3.163682
miscarriage	.3493948	.123347	-2.98	0.003	.1749107	.6979374
married	1.104786	.2976939	0.37	0.712	.6515006	1.873448
site	.4551379	.1889769	-1.90	0.058	.2017054	1.026996
desire	.6160225	.1563536	-1.91	0.056	.3745862	1.013074
partnered	2.406766	.8710857	2.43	0.015	1.184014	4.892276

```
. est stats
```

Model	nobs	ll(null)	ll(model)	df	AIC	BIC
A	448	-282.7918	-282.7918	1	567.5837	571.6885
B	448	-282.7918	-275.2565	2	554.5129	562.7225
C	441	-277.8481	-263.2896	3	532.5792	544.8464
D	441	-277.8481	-261.5842	4	531.1684	547.5246
E	438	-275.1983	-253.2713	5	516.5426	536.9537
F	438	-275.1983	-252.2354	6	516.4708	540.9641
G	437	-274.8093	-249.3898	7	512.7797	541.3392
H	437	-274.8093	-247.4528	8	510.9057	543.5452

```
. logistic lateb agegr ses parity1 misc marr site desire partnered

Logistic regression                             Number of obs   =        371
                                                LR chi2(8)      =      57.68
                                                Prob > chi2     =     0.0000
Log likelihood = -200.83775                     Pseudo R2       =     0.1256
```

latebooking	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
agegroup	.9334141	.2692164	-0.24	0.811	.5303588	1.642778
ses	.418326	.1103253	-3.30	0.001	.249475	.7014596
parity1	1.781903	.5219024	1.97	0.049	1.003634	3.163682
miscarriage	.3493948	.123347	-2.98	0.003	.1749107	.6979374
married	1.104786	.2976939	0.37	0.712	.6515006	1.873448
site	.4551379	.1889769	-1.90	0.058	.2017054	1.026996
desire	.6160225	.1563536	-1.91	0.056	.3745862	1.013074
partnered	2.406766	.8710857	2.43	0.015	1.184014	4.892276

```
. est store I

. est stats
```

Model	nobs	ll(null)	ll(model)	df	AIC	BIC
A	448	-282.7918	-282.7918	1	567.5837	571.6885
B	448	-282.7918	-275.2565	2	554.5129	562.7225
C	441	-277.8481	-263.2896	3	532.5792	544.8464
D	441	-277.8481	-261.5842	4	531.1684	547.5246
E	438	-275.1983	-253.2713	5	516.5426	536.9537
F	438	-275.1983	-252.2354	6	516.4708	540.9641
G	437	-274.8093	-249.3898	7	512.7797	541.3392
H	437	-274.8093	-247.4528	8	510.9057	543.5452
I	371	-229.6783	-200.8378	9	419.6755	454.9213

```
. logistic lateb agegr ses parity1 misc marr site desire partnered partneremp

Logistic regression                               Number of obs   =        371
                                                  LR chi2(9)      =      60.25
                                                  Prob > chi2     =     0.0000
Log likelihood = -199.55093                       Pseudo R2       =     0.1312
```

latebooking	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
agegroup	.9746912	.2843309	-0.09	0.930	.5502496	1.726531
ses	.4343735	.1152729	-3.14	0.002	.2582103	.7307234
parity1	1.73389	.5116941	1.86	0.062	.9723456	3.091879
miscarriage	.350018	.1236073	-2.97	0.003	.1751832	.6993399
married	1.118952	.3032949	0.41	0.678	.6577954	1.903408
site	.466458	.1937669	-1.84	0.066	.2066441	1.052936
desire	.6326145	.1617914	-1.79	0.073	.3832163	1.044322
partnered	2.505097	.9066182	2.54	0.011	1.232443	5.09193
partneremp	.6404243	.1771296	-1.61	0.107	.372427	1.101272

```
. est store J

. est stats
```

Model	nobs	ll(null)	ll(model)	df	AIC	BIC
A	448	-282.7918	-282.7918	1	567.5837	571.6885
B	448	-282.7918	-275.2565	2	554.5129	562.7225
C	441	-277.8481	-263.2896	3	532.5792	544.8464
D	441	-277.8481	-261.5842	4	531.1684	547.5246
E	438	-275.1983	-253.2713	5	516.5426	536.9537
F	438	-275.1983	-252.2354	6	516.4708	540.9641
G	437	-274.8093	-249.3898	7	512.7797	541.3392
H	437	-274.8093	-247.4528	8	510.9057	543.5452
I	371	-229.6783	-200.8378	9	419.6755	454.9213
J	371	-229.6783	-199.5509	10	419.1019	458.2639

```
. logistic lateb agegr ses parity1 misc marr site desire partnered partneremp ag
> epreg

Logistic regression                               Number of obs   =        370
                                                  LR chi2(10)     =      62.04
                                                  Prob > chi2     =     0.0000
```

```
Log likelihood =  -197.4825                     Pseudo R2       =     0.1358

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .8154775   .2747354    -0.61   0.545     .4213482    1.578276
         ses |    .436355   .1173218    -3.08   0.002     .2576197    .7390957
     parity1 |   1.832816   .5554444     2.00   0.046     1.011947    3.319555
 miscarriage |   .3491073   .1238216    -2.97   0.003     .1742024    .6996224
     married |   1.144508   .3118497     0.50   0.620     .6709464    1.952315
        site |   .4668801   .1946001    -1.83   0.068     .2062606    1.056804
      desire |   .6002575   .1551921    -1.97   0.048     .3616311    .9963442
   partnered |   2.674567   .9804306     2.68   0.007     1.303838    5.486344
  partneremp |   .6238437   .1733675    -1.70   0.090     .3618471     1.07554
     agepreg |   1.554866   .5519706     1.24   0.214     .7753903    3.117926
------------------------------------------------------------------------------

. est store K

. est stats

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
           E |    438   -275.1983   -253.2713      5     516.5426    536.9537
           F |    438   -275.1983   -252.2354      6     516.4708    540.9641
           G |    437   -274.8093   -249.3898      7     512.7797    541.3392
           H |    437   -274.8093   -247.4528      8     510.9057    543.5452
           I |    371   -229.6783   -200.8378      9     419.6755    454.9213
           J |    371   -229.6783   -199.5509     10     419.1019    458.2639
           K |    370   -228.5041   -197.4825     11      416.965    460.0135
------------------------------------------------------------------------------

. logistic lateb  ses parity1 misc marr site desire partnered partneremp agepreg

Logistic regression                             Number of obs   =        370
                                                LR chi2(9)      =      61.68
                                                Prob > chi2     =     0.0000
Log likelihood = -197.66638                     Pseudo R2       =     0.1350

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ses |    .427391    .114061    -3.19   0.001     .2533138     .721094
     parity1 |   1.934569   .5598845     2.28   0.023     1.097078    3.411385
 miscarriage |   .3423949   .1209584    -3.03   0.002     .1713255    .6842782
     married |   1.134235   .3081638     0.46   0.643      .665944    1.931829
        site |   .4608471   .1920674    -1.86   0.063      .203611    1.043068
      desire |   .5944393   .1532249    -2.02   0.044     .3586729    .9851819
   partnered |   2.729277   .9957225     2.75   0.006     1.335068    5.579453
  partneremp |   .6162963   .1708249    -1.75   0.081     .3579758    1.061025
     agepreg |   1.404331    .436107     1.09   0.274     .7640709    2.581103
------------------------------------------------------------------------------

. est store L

. est stats

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
           E |    438   -275.1983   -253.2713      5     516.5426    536.9537
           F |    438   -275.1983   -252.2354      6     516.4708    540.9641
           G |    437   -274.8093   -249.3898      7     512.7797    541.3392
           H |    437   -274.8093   -247.4528      8     510.9057    543.5452
           I |    371   -229.6783   -200.8378      9     419.6755    454.9213
           J |    371   -229.6783   -199.5509     10     419.1019    458.2639
           K |    370   -228.5041   -197.4825     11      416.965    460.0135
           L |    370   -228.5041   -197.6664     10     415.3328    454.4678
```

```
------------------------------------------------------------------------------

. lrtest K L, stats

likelihood-ratio test                                 LR chi2(1)  =      0.37
(Assumption: L nested in K)                           Prob > chi2 =    0.5442

------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+----------------------------------------------------------------
           L |    370   -228.5041   -197.6664     10     415.3328     454.4678
           K |    370   -228.5041   -197.4825     11      416.965     460.0135
------------------------------------------------------------------------------

. tab misc matdrin, chi

miscarriag |        matdrin
         e |         0          1 |     Total
-----------+----------------------+----------
         0 |       307         27 |       334
         1 |        72         18 |        90
-----------+----------------------+----------
     Total |       379         45 |       424

          Pearson chi2(1) =  10.6115   Pr = 0.001

. tab misc matsm

miscarriag |        matsmok
         e |         0          1 |     Total
-----------+----------------------+----------
         0 |       306         27 |       333
         1 |        72         20 |        92
-----------+----------------------+----------
     Total |       378         47 |       425


. tab misc matsm, chi

miscarriag |        matsmok
         e |         0          1 |     Total
-----------+----------------------+----------
         0 |       306         27 |       333
         1 |        72         20 |        92
-----------+----------------------+----------
     Total |       378         47 |       425

          Pearson chi2(1) =  13.6172   Pr = 0.000

. logistic lateb  ses parity1 misc marr site desire partnered partneremp agepr
> eg matdri

Logistic regression                               Number of obs   =        352
                                                  LR chi2(10)     =      60.72
                                                  Prob > chi2     =     0.0000
Log likelihood = -188.26127                       Pseudo R2       =     0.1389

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ses |   .4117583   .1139734    -3.21   0.001     .2393495     .708357
     parity1 |   1.980517   .5828394     2.32   0.020     1.112453    3.525946
 miscarriage |    .359159   .1299618    -2.83   0.005     .1767174    .7299519
     married |   1.122406   .3113909     0.42   0.677     .6516279    1.933304
        site |   .4306941   .1824139    -1.99   0.047     .1877827    .9878305
      desire |   .5967457   .1576519    -1.95   0.051     .3555607    1.001532
   partnered |   2.918379   1.112487     2.81   0.005     1.382494    6.160559
  partneremp |   .5676049    .163854    -1.96   0.050     .3223477    .9994654
     agepreg |   1.412855   .4537295     1.08   0.282     .7529039     2.65128
     matdrin |   1.527913   .6505014     1.00   0.319     .6632906    3.519601
------------------------------------------------------------------------------

. est store M

. est stats

------------------------------------------------------------------------------
```

```
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+------------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837     571.6885
           B |    448   -282.7918   -275.2565      2     554.5129     562.7225
           C |    441   -277.8481   -263.2896      3     532.5792     544.8464
           D |    441   -277.8481   -261.5842      4     531.1684     547.5246
           E |    438   -275.1983   -253.2713      5     516.5426     536.9537
           F |    438   -275.1983   -252.2354      6     516.4708     540.9641
           G |    437   -274.8093   -249.3898      7     512.7797     541.3392
           H |    437   -274.8093   -247.4528      8     510.9057     543.5452
           I |    371   -229.6783   -200.8378      9     419.6755     454.9213
           J |    371   -229.6783   -199.5509     10     419.1019     458.2639
           K |    370   -228.5041   -197.4825     11      416.965     460.0135
           L |    370   -228.5041   -197.6664     10     415.3328     454.4678
           M |    352   -218.6224   -188.2613     11     398.5225     441.0225
-------------------------------------------------------------------------------

. logistic lateb  ses parity1 misc marr site desire partnered partneremp agepr
> eg matdri matsm

Logistic regression                               Number of obs   =        352
                                                  LR chi2(11)     =      60.78
                                                  Prob > chi2     =     0.0000
Log likelihood =  -188.2323                       Pseudo R2       =     0.1390

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ses |   .4112631   .1138446    -3.21   0.001     .2390522    .7075329
     parity1 |   1.982046   .5831909     2.33   0.020      1.11342    3.528325
 miscarriage |   .3552035   .1296868    -2.83   0.005     .1736596    .7265335
     married |   1.119467   .3108105     0.41   0.684     .6496545    1.929035
        site |   .4285329   .1816725    -2.00   0.046     .1866918    .9836555
      desire |    .596233   .1575514    -1.96   0.050     .3552144    1.000787
   partnered |   2.924242   1.115527     2.81   0.005     1.384524    6.176265
  partneremp |   .5701625   .1649717    -1.94   0.052     .3233781    1.005279
     agepreg |   1.414028   .4540646     1.08   0.281     .7535722    2.653328
     matdrin |   1.450867   .6921175     0.78   0.435     .5696034    3.695578
     matsmok |   1.119998   .5259586     0.24   0.809     .4461569    2.811559
------------------------------------------------------------------------------

. est store N

. est stats

-------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC          BIC
-------------+------------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837     571.6885
           B |    448   -282.7918   -275.2565      2     554.5129     562.7225
           C |    441   -277.8481   -263.2896      3     532.5792     544.8464
           D |    441   -277.8481   -261.5842      4     531.1684     547.5246
           E |    438   -275.1983   -253.2713      5     516.5426     536.9537
           F |    438   -275.1983   -252.2354      6     516.4708     540.9641
           G |    437   -274.8093   -249.3898      7     512.7797     541.3392
           H |    437   -274.8093   -247.4528      8     510.9057     543.5452
           I |    371   -229.6783   -200.8378      9     419.6755     454.9213
           J |    371   -229.6783   -199.5509     10     419.1019     458.2639
           K |    370   -228.5041   -197.4825     11      416.965     460.0135
           L |    370   -228.5041   -197.6664     10     415.3328     454.4678
           M |    352   -218.6224   -188.2613     11     398.5225     441.0225
           N |    352   -218.6224   -188.2323     12     400.4646     446.8282
-------------------------------------------------------------------------------

. logistic lateb  ses parity1 misc marr site desire partnered partneremp agepr
> eg matsm
```

```
Logistic regression                                     Number of obs   =        354
                                                        LR chi2(10)     =      60.20
                                                        Prob > chi2     =     0.0000
Log likelihood = -189.26744                             Pseudo R2       =     0.1372

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ses |   .4300146   .1176569    -3.08   0.002     .2515271    .7351596
     parity1 |   2.013007   .5912013     2.38   0.017     1.132023    3.579606
 miscarriage |   .3447783   .1255551    -2.92   0.003     .1688748    .7039066
     married |   1.134508   .3149207     0.45   0.649     .6584581    1.954732
        site |   .4517864   .1901854    -1.89   0.059     .1979743    1.030997
      desire |   .5942905    .156239    -1.98   0.048     .3549914    .9949005
   partnered |    2.82411     1.0691     2.74   0.006     1.344773    5.930811
  partneremp |   .5765631   .1655775    -1.92   0.055     .3283965    1.012267
     agepreg |   1.362023   .4352833     0.97   0.334      .728035    2.548099
     matsmok |   1.223519   .5080396     0.49   0.627     .5422103    2.760919
------------------------------------------------------------------------------

. est store O

. est stats

---------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC         BIC
-------------+-------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
           B |    448   -282.7918   -275.2565      2     554.5129    562.7225
           C |    441   -277.8481   -263.2896      3     532.5792    544.8464
           D |    441   -277.8481   -261.5842      4     531.1684    547.5246
           E |    438   -275.1983   -253.2713      5     516.5426    536.9537
           F |    438   -275.1983   -252.2354      6     516.4708    540.9641
           G |    437   -274.8093   -249.3898      7     512.7797    541.3392
           H |    437   -274.8093   -247.4528      8     510.9057    543.5452
           I |    371   -229.6783   -200.8378      9     419.6755    454.9213
           J |    371   -229.6783   -199.5509     10     419.1019    458.2639
           K |    370   -228.5041   -197.4825     11      416.965    460.0135
           L |    370   -228.5041   -197.6664     10     415.3328    454.4678
           M |    352   -218.6224   -188.2613     11     398.5225    441.0225
           N |    352   -218.6224   -188.2323     12     400.4646    446.8282
           O |    354   -219.3692   -189.2674     11     400.5349    443.0971
---------------------------------------------------------------------------

logistic lateb  agegroup ses parity1 misc marr site desire partnered partner
> emp agepreg matsm

Logistic regression                                     Number of obs   =        354
                                                        LR chi2(11)     =      60.49
                                                        Prob > chi2     =     0.0000
Log likelihood = -189.12547                             Pseudo R2       =     0.1379

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .8343055   .2839494    -0.53   0.595     .4281789    1.625642
         ses |   .4385342   .1209667    -2.99   0.003     .2553908    .7530117
     parity1 |   1.916276   .5904141     2.11   0.035     1.047607    3.505237
 miscarriage |   .3517365   .1286341    -2.86   0.004     .1717605    .7202972
     married |   1.143087   .3180852     0.48   0.631     .6625466    1.972159
        site |   .4570938   .1925274    -1.86   0.063     .2002074    1.043591
      desire |   .5986834   .1577577    -1.95   0.052     .3571898    1.003449
   partnered |   2.774759   1.055113     2.68   0.007     1.316899    5.846527
  partneremp |   .5822122   .1674762    -1.88   0.060     .3313058    1.023136
     agepreg |   1.490419   .5413136     1.10   0.272     .7314016    3.037114
     matsmok |   1.214771   .5036532     0.47   0.639     .5389892    2.737846
------------------------------------------------------------------------------

. est store P

. est stats

---------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)     df         AIC         BIC
-------------+-------------------------------------------------------------
           A |    448   -282.7918   -282.7918      1     567.5837    571.6885
```

```
           B |    448   -282.7918   -275.2565       2     554.5129    562.7225
           C |    441   -277.8481   -263.2896       3     532.5792    544.8464
           D |    441   -277.8481   -261.5842       4     531.1684    547.5246
           E |    438   -275.1983   -253.2713       5     516.5426    536.9537
           F |    438   -275.1983   -252.2354       6     516.4708    540.9641
           G |    437   -274.8093   -249.3898       7     512.7797    541.3392
           H |    437   -274.8093   -247.4528       8     510.9057    543.5452
           I |    371   -229.6783   -200.8378       9     419.6755    454.9213
           J |    371   -229.6783   -199.5509      10     419.1019    458.2639
           K |    370   -228.5041   -197.4825      11      416.965    460.0135
           L |    370   -228.5041   -197.6664      10     415.3328    454.4678
           M |    352   -218.6224   -188.2613      11     398.5225    441.0225
           N |    352   -218.6224   -188.2323      12     400.4646    446.8282
           O |    354   -219.3692   -189.2674      11     400.5349    443.0971
           P |    354   -219.3692   -189.1255      12     402.2509    448.6825
-------------------------------------------------------------------------------

. logistic lateb  agegroup ses parity1 misc marr site desire partnered partner
> emp  matsm

Logistic regression                               Number of obs   =        355
                                                  LR chi2(10)     =      59.04
                                                  Prob > chi2     =     0.0000
Log likelihood = -191.01554                       Pseudo R2       =     0.1339

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    agegroup |   .9733227   .2887752    -0.09   0.927      .544144    1.741004
         ses |   .4385214   .1193933    -3.03   0.002     .2571815    .7477247
     parity1 |   1.834426   .5523502     2.02   0.044      1.01672     3.30978
 miscarriage |   .3541986   .1289505    -2.85   0.004     .1735226    .7229989
     married |   1.125359    .311694     0.43   0.670     .6539296    1.936649
        site |   .4571315   .1919395    -1.86   0.062     .2007429    1.040979
      desire |   .6322358   .1646904    -1.76   0.078     .3794465    1.053435
   partnered |   2.619186    .985322     2.56   0.010     1.252995    5.474989
  partneremp |   .5957468   .1709073    -1.81   0.071     .3395235    1.045331
     matsmok |   1.209722   .5009831     0.46   0.646     .5372508     2.72392
------------------------------------------------------------------------------

. est store Q

. est stats

-------------------------------------------------------------------------------
Model        |   nobs    ll(null)   ll(model)      df         AIC          BIC
-------------+-----------------------------------------------------------------
           A |    448   -282.7918   -282.7918       1     567.5837    571.6885
           B |    448   -282.7918   -275.2565       2     554.5129    562.7225
           C |    441   -277.8481   -263.2896       3     532.5792    544.8464
           D |    441   -277.8481   -261.5842       4     531.1684    547.5246
           E |    438   -275.1983   -253.2713       5     516.5426    536.9537
           F |    438   -275.1983   -252.2354       6     516.4708    540.9641
           G |    437   -274.8093   -249.3898       7     512.7797    541.3392
           H |    437   -274.8093   -247.4528       8     510.9057    543.5452
           I |    371   -229.6783   -200.8378       9     419.6755    454.9213
           J |    371   -229.6783   -199.5509      10     419.1019    458.2639
           K |    370   -228.5041   -197.4825      11      416.965    460.0135
           L |    370   -228.5041   -197.6664      10     415.3328    454.4678
           M |    352   -218.6224   -188.2613      11     398.5225    441.0225
           N |    352   -218.6224   -188.2323      12     400.4646    446.8282
           O |    354   -219.3692   -189.2674      11     400.5349    443.0971
           P |    354   -219.3692   -189.1255      12     402.2509    448.6825
           Q |    355   -220.5349   -191.0155      11     404.0311    446.6244
-------------------------------------------------------------------------------
```

Final model

```
logistic lateb  ses parity1 misc marr site desire partnered partneremp agepr
> eg matdri

Logistic regression                               Number of obs   =        352
                                                  LR chi2(10)     =      60.72
                                                  Prob > chi2     =     0.0000
Log likelihood = -188.26127                       Pseudo R2       =     0.1389

------------------------------------------------------------------------------
 latebooking | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ses |   .4117583   .1139734    -3.21   0.001     .2393495     .708357
     parity1 |   1.980517   .5828394     2.32   0.020     1.112453    3.525946
 miscarriage |    .359159   .1299618    -2.83   0.005     .1767174    .7299519
     married |   1.122406   .3113909     0.42   0.677     .6516279    1.933304
        site |   .4306941   .1824139    -1.99   0.047     .1877827    .9878305
      desire |   .5967457   .1576519    -1.95   0.051     .3555607    1.001532
   partnered |   2.918379   1.112487     2.81   0.005     1.382494    6.160559
  partneremp |   .5676049    .163854    -1.96   0.050     .3223477    .9994654
     agepreg |   1.412855   .4537295     1.08   0.282     .7529039     2.65128
     matdrin |   1.527913   .6505014     1.00   0.319     .6632906    3.519601
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APPENDIX B

WOMEN, PREGNANCY AND HEALTH

QUESTIONNAIRE

ENGLISH

Questionnaire Number	
Interviewer Number	
Enumerator Area	

University of Pretoria

MRC SOUTH AFRICA

UNIVERSITY OF CAPE TOWN

TIME NOW: _____

DATE: _____

GENERAL INSTRUCTIONS

We will work through the questionnaire as follows: All your answers will be marked in my copy of the questionnaire. I will ask the questions and give you the answer choices. You will have a copy of the questionnaire so that you can follow along. Pick the answer that is the closest to how you feel. Usually I will want you to tell me the number that goes with the answer you pick. The interview will take between forty five minutes and one hour to complete.

Please note that there are no right or wrong answers to the questions asked. Please feel free to answer just what you think. If there are questions you really do not want to answer, you may skip them.

PLEASE REMEMBER THAT YOUR NAME WILL NOT BE PUT ON THIS QUESTIONNAIRE. Your answers will not be shared with anyone. Only the research staff will have access to the questionnaire once it has been completed.

Thank you for helping us with this study.

Section 1: Demographic Characteristics

First we would like to ask you a few questions about yourself.

Throughout the questionnaire, please circle the correct response.

1.1 How old are you? _____years

1.2 What is the highest level of education you have passed?

Less than one year completed	1
Sub A/Class 1/Grade 1	2
Sub B/Class 2/Grade 2	3
Standard 1/Grade 3	4
Standard 2/Grade 4	5
Standard 3/Grade 5	6
Standard 4/Grade 6	7
Standard 5/Grade 7	8
Standard 6/Grade 8	9
Standard 7/Grade 9	10
Standard 8/Grade 10	11
Standard 9/Grade 11	12
Standard 10/Grade 12	13
Further studies – incomplete	14
Diploma/other post school – complete	15
Degree	16

1.3 What is your current marital status?

Legally married	1
Traditionally married	2
Living with man or woman in union	3
Never married/Single	4
Divorced	5
Married but separated	6
Widow	7

1.4 Which of the following is the main language spoken at home? (Please circle only one)

English	1
Afrikaans	2
IsiXhosa	3
IsiZulu	4
SeSotho	5
SeTswana	6
SePedi	7
SiSwati	8
TshiVenda	9
Zitsonga	10
IsiNdebele	11
Other (Please specify)	12

1.5 Which race group do you consider yourself to belong to?

Black/African	1
Coloured	2
White	3
Asian/Indian	4
Other (Please specify)	5

Section 2: Economic factors

Now we would like to ask a few questions about you, your work and the money that is available to you to spend.

2.1 Have you done any paid work in the last 12 months?

No	0
Yes	1

2.2 Which of the following describes your current employment status?

Unemployed	1
Employed part-time	2
Employed full-time	3
Self-employed	4

2.3 What kind of work do you do? (If working, please tell me your occupation. For example, plumber, street trader, cattle farmer, primary school teacher, domestic worker)

Not working	0
Working (Please specify)	1

2.4 If you are not working, how do you spend your free time when other people are at work?

2.5 Please indicate which of the following are your sources of income. Please answer this question whether or not you are working.

		Yes	No
A	Work	1	0
B	Spouse/partner	1	0
C	Parents	1	0
D	Brothers and/or sisters	1	0
E	Children	1	0
F	Child Support Grant	1	0
G	State Old Age Pensions	1	0
H	Disability Grant	1	0
I	Care Dependency Grant	1	0
J	Foster Care Grant	1	0
K	Grants-in-Aid	1	0
L	Workman's Compensation Fund	1	0
M	Other (Please specify)	1	0

Section 3: Household factors

3.1 Is the house you live in:

Owned by your family	1
Rented	2
Owned by farmer	3
Other (please specify)	4

3.2 How many rooms are there in the house?

[ ] Rooms

3.3 How many bedrooms are there in the house?

[ ] Bedrooms

3.4 How many bathrooms are there in the house?

[ ] Bathrooms

3.5 Does your house have:

		Yes	No
A	Electricity	1	0
B	A radio	1	0
C	A television	1	0
D	A telephone	1	0
E	A fridge	1	0
F	A computer	1	0
G	A washing machine	1	0
H	A cell phone (anybody)	1	0

3.6 Which of the following live in the same household with you?

		Yes	No
A	Live alone	1	0
B	Husband	1	0
C	Partner	1	0
D	Child or Children	1	0
E	Brother(s) and/or sister(s)	1	0
F	Mother/Female guardian	1	0
G	Father/Male guardian	1	0
H	Grandparent(s)	1	0
I	Other (please specify)	1	0

3.7 How many people usually live and sleep in your household?

[ ] Number of people

3.8 Let us speak about your household and what it can afford. How often do the people here go hungry or have no food to eat?

Never	0
Seldom	1
Sometimes	2
Often	3

3.9 Your family has enough money for:

		Never	Some-times	Always	Not Applicable
A	Buying food	0	1	2	9
B	Paying for transport (bus, taxi, train fare, petrol bills)	0	1	2	9
C	Paying bills (rent, light, water, telephone, etc.)	0	1	2	9
D	Paying doctors and for medicine	0	1	2	9
E	Buying school supplies, uniforms, books, shoes	0	1	2	9
F	Buying clothes	0	1	2	9
G	Buying firewood, coal, paraffin	0	1	2	9
H	Paying for funerals and other ceremonies/festivities	0	1	2	9

Section 4: Community

4.1 For how long have you lived in this community?

	Years
	Months

Please indicate the extent to which you agree with the following statements about your community.

		Strongly Agree	Moderately Agree	Neither Agree Nor Disagree	Moderately Disagree	Strongly Disagree
4.2	There are many recreational facilities in your community	0	1	2	3	4
4.3	You can easily use the recreational facilities in your community	0	1	2	3	4
4.4	It is easy for you to buy alcohol in your community if you want to	0	1	2	3	4
4.5	A lot of people drink heavily in your community	0	1	2	3	4
4.6	Your community accepts the abuse of alcohol	0	1	2	3	4
4.7	There are many advertisements of alcoholic drinks in your community	0	1	2	3	4
4.8	People around here are willing to help their neighbours	0	1	2	3	4
4.9	This is a close-knit or tight neighbourhood where people generally know each other	0	1	2	3	4
4.10	If you had to borrow R100 in an emergency, you could borrow it from a neighbour	0	1	2	3	4
4.11	People in this neighbourhood generally don't get along with each other	0	1	2	3	4
4.12	People in this neighbourhood can be trusted	0	1	2	3	4
4.13	If you were sick you could count on your neighbours to shop for groceries for you	0	1	2	3	4
4.14	People in this neighbourhood do not share the same values	0	1	2	3	4

Section 5: Your feelings about yourself

Below is a list of statements dealing with your general feelings about yourself. Please indicate the extent to which you agree with each statement.

		Strongly agree	Agree	Disagree	Strongly disagree
5.1	On the whole, I am satisfied with myself	1	2	3	4
5.2	At times, I think I am no good at all	1	2	3	4
5.3	I feel that I have a number of good qualities	1	2	3	4
5.4	I am able to do things as well as most people	1	2	3	4
5.5	I feel I do not have much to be proud of	1	2	3	4
5.6	I certainly feel useless at times	1	2	3	4
5.7	I feel that I am a person of worth, at least on an equal plane with others	1	2	3	4
5.8	I wish I could have more respect for myself	1	2	3	4
5.9	All in all, I am inclined to feel that I am a failure	1	2	3	4
5.10	I take a positive attitude towards myself	1	2	3	4

Section 6: Health

6.1 In general, would you say your health is:

Excellent	1
Very Good	2
Good	3
Fair	4
Poor	5

6.2 For how long (if at all) has your health limited you in each of the following activities? Please choose one number on each line.

		Limited for more than 3 months	Limited for 3 months or less	Not limited at all
A	The kinds or amounts of vigorous activities you can do, like lifting heavy objects, running or participating in strenuous sports	1	2	3
B	The kinds or amounts of moderate activities you can do, like moving a table, carrying groceries	1	2	3
C	Walking uphill or climbing a flight of stairs	1	2	3
D	Bending, lifting or stooping	1	2	3
E	Taking a ten-minute walk	1	2	3
F	Eating, dressing, bathing or using the toilet	1	2	3

6.3 How much bodily pain have you had during the past 4 weeks?

None	1
Very Mild	2
Mild	3
Moderate	4
Severe	5
Very Severe	6

6.4 Does your health keep you from working at a job, doing work around the house or going to school?

Yes, for more than 3 months	1
Yes, for 3 months or less	2
No	3

6.5 Have you been unable to do certain kinds or amounts of work, housework or schoolwork because of your health?

Yes, for more than 3 months	1
Yes, for 3 months or less	2
No	3

For each of the following questions, please choose the number for the one answer that comes closest to the way you have been feeling during the past month.

		All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
6.6	How much of the time, during the past month, has your health limited your social activities (like visiting friends or close relatives)?	1	2	3	4	5	6
6.7	How much of the time, during the past month, have you been a very nervous person?	1	2	3	4	5	6
6.8	During the past month, how much of the time have you felt calm and peaceful?	1	2	3	4	5	6
6.9	How much of the time, during the past month, have you felt downhearted and blue?	1	2	3	4	5	6
6.10	During the past month, how much of the time have you been a happy person?	1	2	3	4	5	6
6.11	How often, during the past month, have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6

6.12 Please choose the number that best describes the extent to which each of the following statements is true or false for you.

		Definitely true	Mostly true	Not sure	Mostly false	Definitely false
A	I am somewhat ill	1	2	3	4	5
B	I am as healthy as anybody I know	1	2	3	4	5
C	My health is excellent	1	2	3	4	5
D	I have been feeling bad lately	1	2	3	4	5

Section 7: Alcohol Use

The questions in this section are about your drinking of alcoholic beverages.

7.1 Have you ever had a drink containing alcohol?

No	0
Yes	1

IF NO PLEASE GO TO QUESTION 7.26.

7.2 How old were you when you first started drinking alcohol?

	Years

7.3 Do you still take a drink with alcohol sometimes?

No	0
Yes	1

7.4 Why did you stop drinking alcohol?

Not applicable/still drinking alcohol	9

_____

_____

_____

7.5 When did you stop drinking alcohol?

0-6 months ago	1
7-12 months ago	2
13-24 months ago	3
25-36 months ago	4
37 months or more	5
Not applicable	9

IF YOU HAVE NOT HAD AN ALCOHOLIC DRINK IN THE PAST YEAR, PLEASE GO TO QUESTION 7.26.

7.6 How often do you have a drink containing alcohol?

Monthly or less	1
2 to 4 times a month	2
2 to 3 times a week	3
4 or more times a week	4

7.7 On how many days have you drunk alcohol during the past month?

	Days

7.8 What type(s) of alcoholic beverages do you usually drink?

		Yes	No
A	Beer	1	0
B	Cider (e.g. Crossbow, Crown, Hunters, Redds, Savannah, Strongbow)	1	0
C	Bottled wine	1	0
D	Papsak wine	1	0
E	Coolers (e.g. Archers, Bacardi Breezer, Brutal Fruit, Esprit, Hooch, Red Square, Smirnoff Spin, Smirnoff Storm, Smirnoff Triple Spin, Solantis)	1	0
F	Spirits (e.g. gin, whisky, vodka, brandy)	1	0
G	Liqueurs (e.g. Amarula)	1	0
H	Home brew	1	0

7.9 Where do you buy your alcohol?

		Yes	No
A	I do not buy my alcohol	1	0
B	Liquor store	1	0
C	Supermarket/Café	1	0
D	Spaza shop	1	0
E	Night club/Disco	1	0
F	Shebeen	1	0
G	Restaurant/Pub	1	0
H	Tavern	1	0
I	Neighbour	1	0
J	Other (Please specify)	1	0

7.10 When you are not paying for your alcohol, how do you get it?

		Yes	No
A	I make it myself	1	0
B	I get it on credit	1	0
C	I work for it	1	0
D	I exchange goods (e.g. clothes) for it	1	0
E	It is bought for me/given to me	1	0
F	I take it without paying for it	1	0
G	Other (Please specify)	1	0

7.11 How many drinks containing alcohol do you have on a typical day when you are drinking? (Please note that one drink is equivalent to one can or bottle of beer, cider or coolers, one glass of wine, or one tot of spirits).

None	0	
1 or 2	1	
3 or 4	2	
5 or 6	3	
7 to 9	4	
10 or more	5	
Other, please specify. If you drink homebrew please indicate the name of the homebrew, type of container, and quantity consumed.	6	

7.12 In which of the following type(s) of venues or events do you usually drink alcohol?

		Yes	No
A	Home	1	0
B	Park/Outdoors	1	0
C	Restaurant	1	0
D	Tavern	1	0
E	Shebeen	1	0
F	Bar	1	0
G	Car park(s)	1	0
H	Friend's home	1	0
I	Party	1	0
J	Festival/Concert	1	0
K	Other (please specify)	1	0

7.13 With whom do you usually drink alcohol? (Please circle only one)

Alone	1
With friend(s)	2
With relative(s)	3
With partner	4
With whoever is in the drinking place	5
With other (please specify)	6

Below is a list of questions about your drinking behaviour. Please choose the option that best reflects your behaviour

		Never	Less than monthly	Monthly	Weekly	Daily or almost daily
7.14	How often do you have six or more drinks on one occasion?	0	1	2	3	4
7.15	How often during the last year have you found that you were unable to stop drinking once you had started?	0	1	2	3	4
7.16	How often during the last year have you failed to do what was normally expected from you because of drinking?	0	1	2	3	4
7.17	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	0	1	2	3	4
7.18	How often during the last year have you had a feeling of guilt or remorse after drinking?	0	1	2	3	4
7.19	How often during the last year have you been unable to remember what happened the night before because you had been drinking?	0	1	2	3	4
7.20	Have you or someone else been injured as a result of your drinking?	0	1	2	3	4
7.21	Has a relative, friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?	0	1	2	3	4

7.22 Have you ever felt you ought to cut down drinking?

No	0
Yes	1

7.23 Have people annoyed you for criticising your drinking?

No	0
Yes	1

7.24 Have you ever felt guilty about your drinking?

No	0
Yes	1

7.25 Have you ever had a drink first thing in the morning?

No	0
Yes	1

7.26 Whom among the following family members has had an alcohol problem?

		Yes	No
A	Mother	1	0
B	Father	1	0
C	Uncle	1	0
D	Aunt	1	0
E	Sister	1	0
F	Brother	1	0

7.27 Are there any warning labels about the health risks of drinking alcohol on any alcohol containers?

No	0
Yes	1
Do not know	2

7.28 Does the drinking of alcohol during pregnancy have any effect on the unborn foetus?

No	0
Yes	1
Sometimes	2
Don’t know	3

7.29 In what ways can a baby be affected if a mother drinks in pregnancy?
[This question is to be coded by the interviewer, according to the instructions received.]

	Yes	No
A Social integration	1	0
B Physical growth	1	0
C Intellectual ability	1	0
D Learning problems	1	0
E Behavioural problems	1	0
F Specific facial features	1	0
G Speech problems	1	0
H Other (please specify)	1	0

Section 8: Smoking and Other Drug Use

8.1 Have you ever tried or experimented with cigarette smoking, even one or two puffs?

No	0
Yes	1

8.2 How old were you when you smoked a whole cigarette for the first time?

	Years

8.3 Have you ever smoked at least 100 cigarettes (5 packets of cigarettes) or the equivalent amount of tobacco in your lifetime?

No	0
Yes	1

8.4 During the past 30 days, on how many days did you smoke cigarettes?

	Days

8.5 During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?

I did not smoke during the past 30 days	0
Less than 1 cigarette per day	1
1 cigarette per day	2
2 to 5 cigarettes per day	3
6 to 10 cigarettes per day	4
11 to 20 cigarettes per day	5
More than 20 cigarettes per day	6

8.6 Have you ever used snuff?

No	0
Yes	1

8.7 How old were you when you first used snuff? CIRCLE 99 IF YOU HAVE NEVER USED SNUFF.

	Years
99	

8.8 During the past 30 days, on how many days did you use snuff?

	Days

8.9 Have you ever taken medicines for purposes other than their intended use (e.g. to change the way you feel, think, or behave)?

		Yes	No
A	Over-the-counter medication	1	0
B	Prescription medication	1	0

8.10 Have you ever used any of the following drugs?

		Yes	No
A	Dagga	1	0
B	Mandrax	1	0
C	Heroin	1	0
D	Crack/cocaine	1	0
E	Ecstasy	1	0
F	Methamphetamine (tik)	1	0
G	Other	1	0

8.11 During the past 30 days, on how many days did you use each of the following drugs, if at all?

		0 days	1 or 2 days	3 to 5 days	6 to 9 days	10 to 19 days	20 to 29 days	All 30 days
A	Dagga	0	1	2	3	4	5	6
B	Mandrax	0	1	2	3	4	5	6
C	Heroin	0	1	2	3	4	5	6
D	Crack/cocaine	0	1	2	3	4	5	6
E	Ecstasy	0	1	2	3	4	5	6
F	Methamphetamine (tik)	0	1	2	3	4	5	6
G	Over-the-counter medication (not for its intended use)	0	1	2	3	4	5	6
H	Prescription medication (not for its intended use)	0	1	2	3	4	5	6
I	Other	0	1	2	3	4	5	6

Section 9: Sexual Behaviour

This section deals with sexual behaviour. Please note that these questions concern any male partner, including husbands, males with whom you are cohabiting, or other partners.

9.1 When was the last time you had sex, if ever?

Never	0
Within the last week	1
Within the last month	2
More than one month ago	3

IF YOU HAVE NEVER HAD SEX, PLEASE GO TO QUESTION 10.5

9.2 Who did you last have sex with?

Husband	1
Boyfriend	2
Other regular partner	3
Casual acquaintance	4
Someone just met	5
Other (Please specify)	6

9.3 How old were you when you first had sex?

	Years

9.4 What is the total number of sexual partners you have had in the past three months?

None	0
1	1
2-3	2
4-5	3
6-7	4
8-9	5
More than 9	6

9.5 How often have you had sex under the influence of alcohol in the past three months?

Never	0
1-3 times	1
4-6 times	2
7-9 times	3
10-12 times	4
More than 12 times	5

Section 10: Use of Condoms

The questions in this section concern condom use.

10.1 How frequently have you used condoms with your spouse or regular partner(s) in the past 3 months?

Never	0
Seldom	1
Sometimes	2
Always	3
Not applicable (respondent had no spouse or regular partner in the past three months)	9

10.2 How frequently have you used condoms with casual partners in the past 3 months?

Never	0
Seldom	1
Sometimes	2
Always	3
Not applicable (respondent had no casual partner in the past three months)	9

10.3 The last time you had sex, was a condom used?

No	0
Yes	1
Don't know	2
Not applicable	9

10.4 Why did you not use a condom the last time you had sex?

		Yes	No	Not Applicable
A	I did not want to use a condom	1	0	9
B	I did not need to use a condom	1	0	9
C	I did not like condoms	1	0	9
D	I did not know about condoms	1	0	9
E	I did not have a condom	1	0	9
F	Other (Please specify)	1	0	9
G	I used a condom the last time I had sex	1	0	9

10.5 Where can you get condoms from?

		Yes	No
A	Government Hospital	1	0
B	Day Hospital/Clinic	1	0
C	Community Health Centre	1	0
D	Family Planning Clinic	1	0
E	Mobile Clinic	1	0
F	Community Health Worker	1	0
F	Private Hospital/Clinic	1	0
G	Pharmacy	1	0
H	Private Doctor	1	0
I	Supermarket	1	0
J	Filling station	1	0
K	Other (Please specify)	1	0

10.6 How easy is it for you to buy condoms in your community?

Very difficult	0
Quite difficult	1
Quite easy	2
Very easy	3

10.7 How easy is it for you to get free condoms from clinics in your community?

Very difficult	0
Quite difficult	1
Quite easy	2
Very easy	3

10.8 How important is it for you to use condoms when you have sexual intercourse with a casual partner?

Extremely important	0
Quite important	1
Quite unimportant	2
Extremely unimportant	3

10.9 How important is it for you to use condoms when you have sexual intercourse with your regular partner?

Extremely important	0
Quite important	1
Quite unimportant	2
Extremely unimportant	3

Section 11: Use of Contraceptives

11.1 How old were you when you had your first period?

Less than ten years old	1
Ten to fifteen years old	2
Sixteen to twenty years old	3
Beyond twenty years old	4

11.2 Have you ever used anything or tried in any way to delay or avoid getting pregnant?

No	0
Yes	1

11.3 Which is the main method that you are using now to delay or avoid getting pregnant?

Pill	1
IUD	2
Injections	3
Diaphragm/foam/jelly	4
Condom	5
Female sterilisation	6
Male sterilisation	7
Calendar/rhythm	8
Withdrawal	9
Traditional herbs/remedies	10
Abstinence	11
Other (Please specify)	12
None	99

11.4 How long have you used this method?

	Years
	Months
99	Not applicable

11.5 Which are the methods that you have used in the past to delay or avoid getting pregnant?

		Yes	No
A	Pill	1	0
B	IUD	1	0
C	Injections	1	0
D	Diaphragm/foam/jelly	1	0
E	Condom	1	0
F	Female sterilisation	1	0
G	Male sterilisation	1	0
H	Calendar/rhythm	1	0
I	Withdrawal	1	0
J	Traditional herbs/remedies	1	0
K	Abstinence	1	0
L	Other (Please specify) _____	1	0
M	Unsure	1	0
N	None	1	0

11.6 Where do/did you obtain the method you are using currently?

Government Hospital	1
Government Clinic	2
Community Health Centre	3
Family Planning Clinic	4
Private Hospital	5
Private Clinic	6
Private Doctor	7
Mobile clinic	8
Pharmacy/Chemist	9
Traditional healer	10
Faith healer	11
Don't know	12
Other (Please specify) _____	13
Not applicable	99

11.7 How old were you when you first used something to avoid getting pregnant?

	Years
99	Not applicable

11.8 From whom did you first get information about methods to avoid pregnancy? (Circle as many as apply)

		Yes	No
A	Mother	1	0
B	Sister	1	0
C	Father	1	0
D	Other Relative	1	0
E	Friend	1	0
F	Teacher	1	0
G	Nurse	1	0
H	Doctor	1	0
I	Social Worker	1	0
J	Poster/Leaflet/Magazine	1	0
K	Radio/Television	1	0
L	Other (Please specify)	1	0

11.9 Did your parent(s) or guardian(s) give you advice on contraceptives or explain how to use them?

No	0
Yes	1

Section 12: Social Support

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

		None of the time	A little of the time	Some of the time	Most of the time	All of the time
12.1	Someone you can count on to listen to you when you need to talk	1	2	3	4	5
12.2	Someone to give you information to help you understand a situation	1	2	3	4	5
12.3	Someone to give you good advice about a crisis	1	2	3	4	5
12.4	Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
12.5	Someone whose advice you really want	1	2	3	4	5
12.6	Someone to share your most private worries and fears with	1	2	3	4	5
12.7	Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
12.8	Someone who understands your problems	1	2	3	4	5
12.9	Someone who shows you love and affection	1	2	3	4	5
12.10	Someone to love and make you feel wanted	1	2	3	4	5
12.11	Someone who hugs you	1	2	3	4	5
12.12	Someone to have a good time with	1	2	3	4	5
12.13	Someone to get together with for relaxation	1	2	3	4	5
12.14	Someone to do something enjoyable with	1	2	3	4	5

Section 13: Culture

This section has questions concerning your culture. We are interested in knowing what kinds of behaviour would be considered to be in accordance with your culture and the kinds of behaviours that would be unacceptable according to your culture.

13.1 According to your culture men are entitled to have as many children as they wish to have

Strongly agree	1
Moderately agree	2
Moderately disagree	3
Strongly disagree	4

13.2 According to your culture, how wrong is it not to have children if you do not want to?

Always wrong	1
Usually wrong	2
Sometimes wrong	3
Never wrong	4

13.3 According to your culture, having children is a sign that you are a worthy woman.

Very true	1
Somewhat true	2
Somewhat untrue	3
Very untrue	4

13.4 According to your culture, for a man to have children is a sign that he is a worthy man.

Very true	1
Somewhat true	2
Somewhat untrue	3
Very untrue	4

Section 14: Pregnancy Experiences

Now I would like to ask you about your pregnancies and the health of your last born child.

14.1 How many children have you given birth to in your lifetime?

None	0
One	1
Two	2
Three	3
Four	4
Five	5
Six	6
Seven	7
Eight	8
Nine	9
Ten	10
More than ten	11

14.2 How many miscarriages have you had in total, if any?

None	0
1 to 2	1
3 to 4	2
5 or more	3

IF NEVER PREGNANT AND NEVER HAD MISCARRIAGES, PLEASE GO TO SECTION 17.

14.3 At the time you became pregnant with your last child, how much did you want to become pregnant then?

A great deal	1
A little	2
Not much	3
Not at all	4

IF RESPONDENT ANSWERED "A GREAT DEAL", THEN Q14.4 SHOULD BE "NOT APPLICABLE"

14.4 How much longer would you like to have waited?

	Months
	Years
9	Not applicable

14.5 When you were pregnant, to whom did you go for antenatal care for this pregnancy? (Circle as many as apply)

		Yes	No
A	No one	1	0
B	Doctor	1	0
C	Nurse/midwife	1	0
D	Traditional birth attendant	1	0
E	Other person (Please specify)	1	0

14.6 Where did you go for antenatal care the majority of times during the last pregnancy?

Public hospital	1
Private hospital	2
Public clinic	3
Public surgery	4
Private midwife's office	5
Other (please specify)	6
Not applicable	9

14.7 How many months pregnant were you when you first received antenatal care?

[ ] Months

14.8 How many times did you go for antenatal appointments during this pregnancy?

[ ] Times

14.9 What was the outcome of the pregnancy?

Full-term	1
Pre-term (premature)	2
Still-born	3
Voluntarily terminated pregnancy	4
Miscarriage	5

14.10 Did you have any complications at birth?

No	0
Yes (please specify)	1

14.11 Where did you give birth?

Home	1
Government Hospital	2
Day hospital/clinic/community health centre	3
Private hospital/clinic	4
Other (Please specify)	5

14.12 Who assisted with the delivery? (Please circle as many as apply)

	Yes	No
A. Doctor	1	0
B. Nurse/midwife	1	0
C. Traditional birth attendant	1	0
D. Relative/friend	1	0
E. Other (please specify)	1	0

14.13 Was your child delivered by caesarean section?

No	0
Yes	1

14.14 How much did your child weigh at birth?

	Kilograms
99	Do not know/do not remember

14.15. How old were you when you gave birth to your last child?

	Years
99	Do not know/do not remember

Section 15: Pregnancy and Alcohol Use

I would like you to now think about this pregnancy or the last time you became pregnant.

15.1 How many months pregnant are you right now?

Not Pregnant	0
1 month	1
2 months	2
3 months	3
4 months	4
5 months	5
6 months	6
7 months	7
8 months	8
9 months	9
Do not know	10

15.2 When last were you pregnant?

In the past year	1
More than one year but less than two years ago	2
More than two years but less than three years ago	3
More than three years but less than four years ago	4
More than four years but less than five years ago	5
More than five years ago	6

15.3 Did you plan to stop smoking because of the pregnancy?

No	0
Yes	1
Not applicable/Not smoking at time of falling pregnant	9

15.4 Did you plan to stop drinking because of the pregnancy?

No	0
Yes	1
Not applicable/Not drinking at time of falling pregnant	9

IF NOT APPLICABLE, PLEASE GO TO QUESTION 16.1

15.5 Whom among the following has advised you to stop drinking during pregnancy? (Please circle as many as apply)

		Yes	No
A	No one	1	0
B	Doctor	1	0
C	Nurse/midwife	1	0
D	Social Worker	1	0
E	Traditional birth attendant	1	0
F	Other person (please specify)	1	0

15.6 Please specify how your drinking changed when you received the advice, and the reason(s) for the change:

I stopped drinking	0	
I reduced my drinking	1	
My drinking did not change	2	
I increased my drinking	3	

15.7 Which of the following factors made it difficult for you to stop drinking during pregnancy?

		Definitely true	Mostly true	Not sure	Mostly false	Definitely false
A	Influences from my friend(s)	0	1	2	3	4
B	Influences from my partner(s)	0	1	2	3	4
C	Influences from family member(s)	0	1	2	3	4
D	Stress	0	1	2	3	4
E	I felt addicted	0	1	2	3	4
F	I enjoyed drinking too much	0	1	2	3	4

15.8 Which of the following factors made it easy for you to stop drinking during pregnancy?

		Definitely true	Mostly true	Not sure	Mostly false	Definitely false
A	My friend(s)	0	1	2	3	4
B	My partner(s)	0	1	2	3	4
C	Family members	0	1	2	3	4
D	Health and/or Social Services	0	1	2	3	4
E	Lack of stress	0	1	2	3	4
F	I did not feel addicted	0	1	2	3	4
G	I did not enjoy drinking anymore	0	1	2	3	4

15.9 During the three months before you became pregnant, how often did you have a drink containing alcohol?

Never	0
Monthly or less	1
2 to 4 times a month	2
2 to 3 times a week	3
4 or more times a week	4

15.10 During the three months before you became pregnant, on what days did you drink alcohol?

Never	0
Occasionally	1
Weekdays only	2
Weekends only	3
Weekdays and weekends	4

15.10 During the three months before you became pregnant, how many drinks containing alcohol did you have on a typical day when you were drinking?

None	0
1 or 2	1
3 or 4	2
5 or 6	3
7 to 9	4
10 or more	5
Other, please specify. If the respondent drank homebrew please ask her to indicate the name of the homebrew, type of container, and quantity consumed.	6

Now I would like you to think about the period during which you were pregnant…

15.12 After you knew you were pregnant, how often did you have a drink containing alcohol?

Never	0
Monthly or less	1
2 to 4 times a month	2
2 to 3 times a week	3
4 or more times a week	4

15.13 After you knew you were pregnant, on what days did you drink alcohol?

Never	0
Occasionally	1
Weekdays only	2
Weekends only	3
Weekdays and weekends	4

15.14 After you knew you were pregnant, how many drinks containing alcohol did you have on a typical day when you were drinking?

None	0
1 or 2	1
3 or 4	2
5 or 6	3
7 to 9	4
10 or more	5
Other, please specify. If the respondent drank homebrew please ask her to indicate the name of the homebrew, type of container, and quantity consumed.	6

15.15 After you knew you were pregnant, how easy/difficult was it to reduce/stop your drinking?

Very difficult	0
Quite difficult	1
Quite easy	2
Very easy	3
I did not try to reduce my drinking/I never drank before	9

Now I would like to ask you about your next pregnancy, if you were to become pregnant again in the future.

15.16 For you to abstain from alcohol during your next pregnancy would be:

Extremely good	1
Moderately good	2
Neither good nor bad	3
Moderately bad	4
Extremely bad	5

15.17 For you to abstain from alcohol during your next pregnancy would be:

Extremely easy	1
Moderately easy	2
Neither easy nor difficult	3
Moderately difficult	4
Extremely difficult	5

15.18 For you to abstain from alcohol during your next pregnancy would be:

Completely under your control	1
Moderately under your control	2
Neither under your control nor not under your control	3
Moderately not under your control	4
Extremely not under your control	5

15.19 Most people who are important to you think that you should abstain from alcohol during your next pregnancy:

Strongly agree	1
Moderately agree	2
Neither agree nor disagree	3
Moderately disagree	4
Strongly disagree	5

15.20 How likely is it that you will abstain from alcohol during your next pregnancy?

Extremely likely	1
Moderately likely	2
Neither likely nor unlikely	3
Moderately unlikely	4
Extremely unlikely	5

The next questions are about the health of your last born child, and of your children in general.

15.21 If your child has any problems, how severe are they?

	Not at all	Mildly	Moderately	Severely	Not applicable
A Social integration	0	1	2	3	9
B Physical growth	0	1	2	3	9
C Intellectual ability	0	1	2	3	9
D Learning	0	1	2	3	9
E Behavioural	0	1	2	3	9
F Specific facial	0	1	2	3	9
G Speech/language	0	1	2	3	9

15.22 Have you ever been told that a child of yours has foetal alcohol syndrome?

No	0
Yes	1
Maybe	2
Not applicable	9

Section 16: Male partners

The questions in this section are about the man who was in your life at the time of your last pregnancy.

16.1 Who was in your life?

No one	0
Father of the child	1
Someone else	2

IF NO ONE WAS IN YOUR LIFE AT THE TIME OF YOUR LAST PREGNANCY, PLEASE GO TO SECTION 18

16.2 How old was he then? _____years

16.3 What was the highest (standard/year) he completed at school?

Less than one year completed	1
Sub A/Class 1/Grade 1	2
Sub b/Class 2/Grade 2	3
Standard 1/Grade 3	4
Standard 2/Grade 4	5
Standard 3/Grade 5	6
Standard 4/Grade 6	7
Standard 5/Grade 7	8
Standard 6/Grade 8	9
Standard 7/Grade 9	10
Standard 8/Grade 10	11
Standard 9/Grade 11	12
Standard 10/Grade 12	13
Further studies – incomplete	14
Diploma/other post school – complete	15
Degree	16
Do not know	17

16.4 Did he work?

No	0
Yes	1

16.5 What was his occupation? That is, what kind of work did he mainly do?

Not working	9	
Type of work		

Please indicate how strongly you agree or disagree with the following statements.

		Strongly agree	Moderately agree	Neither agree nor disagree	Moderately disagree	Strongly disagree
16.6	You were satisfied with your relationship with this person	1	2	3	4	5
16.7	Sometimes there were serious disagreements between you and him	1	2	3	4	5
16.8	Sometimes there was hitting or slapping between you and him	1	2	3	4	5
16.9	You had a lot of control in your relationship with him	1	2	3	4	5
16.10	There was a lot of trust between you and him	1	2	3	4	5

Now I would like to ask about his drinking of alcoholic beverages.

		Never	Less than monthly	Monthly	Weekly	Daily or almost daily
16.11	How often did he have a drink containing alcohol?	0	1	2	3	4
16.12	How often did you drink with him?	0	1	2	3	4
16.13	How often did he have six or more drinks on one occasion?	0	1	2	3	4

Now I would like to ask about the effect of his drinking of alcoholic beverages

		No	Yes	Don't know
16.14	Was he or someone else ever injured as a result of his drinking?	0	1	2
16.15	Did a relative, friend, or a doctor or other health worker ever express concern about his drinking or suggest that he cut down?	0	1	2

16.16 How many drinks containing alcohol did he have on a typical day when he was drinking?

None	0
1 or 2	1
3 or 4	2
5 or 6	3
7 to 9	4
10 or more	5

16.17 Did you feel obliged to drink alcohol when your partner was drinking?

Never	0
Sometimes	1
Always	2

Section 17: Your Current Partner

We would now like to ask the same questions about your current partner, whether or not he is the same man we just spoke about.

17.1 Who is your current partner?

No one	0
Father of the child	1
Someone else	2

IF NO ONE, PLEASE MOVE TO SECTION 18.

17.2 Is your current partner the person you just spoke about in Section 16?

No	0
Yes	1

17.3 How old is he now? _____ years

17.4 What was the highest (standard/year) he completed at school?

Less than one year completed	1
Sub A/Class 1/Grade 1	2
Sub B/Class 2/Grade 2	3
Standard 1/Grade 3	4
Standard 2/Grade 4	5
Standard 3/Grade 5	6
Standard 4/Grade 6	7
Standard 5/Grade 7	8
Standard 6/Grade 8	9
Standard 7/Grade 9	10
Standard 8/Grade 10	11
Standard 9/Grade 11	12
Standard 10/Grade 12	13
Further studies – incomplete	14
Diploma/other post school – complete	15
Degree	16

17.5 Does he currently work?

No	0
Yes	1

17.6 What is his occupation? That is, what kind of work does he mainly do?

Not working	9
Type of work	

Please indicate how strongly you agree or disagree with the following statements.

	Strongly agree	Moderately agree	Neither agree nor disagree	Moderately disagree	Strongly disagree
17.7 You are satisfied with your relationship with this person	1	2	3	4	5
17.8 Sometimes there are serious disagreements between you and him	1	2	3	4	5
17.9 Sometimes there is hitting or slapping between you and him	1	2	3	4	5
17.10 You have a lot of control in your relationship with him	1	2	3	4	5
17.11 There is a lot of trust between you and him	1	2	3	4	5

Now I would like to ask about his drinking of alcoholic beverages.

		Never	Less than monthly	Monthly	Weekly	Daily or almost daily
17.12	How often does he have a drink containing alcohol?	0	1	2	3	4
17.13	How often do you drink with him?	0	1	2	3	4
17.14	How often does he have six or more drinks on one occasion?	0	1	2	3	4

Now I would like to ask about the effect of his drinking of alcoholic beverages

		No	Yes	Don't know
17.15	Has he or someone else ever been injured as a result of his drinking?	0	1	2
17.17	Did a relative, friend, or a doctor or other health worker ever express concern about his drinking or suggest that he cut down?	0	1	2

17.17 How many drinks containing alcohol does he have on a typical day when he is drinking?

None	0
1 or 2	1
3 or 4	2
5 or 6	3
7 to 9	4
10 or more	5

17.18 Do you feel obliged to drink alcohol when your partner is drinking?

No	0
Yes	1

Section 18: Religious Orientation

These questions inquire about some aspects of your religious life. Please answer each by choosing the option which best represents your normal practice.

18.1 How religious do you consider yourself to be?

Very religious	1
Quite religious	2
Fairly religious	3
Not very religious	4
Not at all religious	5

18.2 How often do you attend religious services?

Frequently	1
Often	2
Sometimes	3
Seldom	4
Never	5

18.3 How often do you pray?

Five times a day	1
More than twice a day	2
Once a day	3
Only when necessary	4
Seldom if ever	5

18.4 How often do you read the Holy Scriptures/Quran…..?

Daily	1
Often	2
Occasionally	3
Seldom	4
Never	5

18.5 How often do you watch or listen to religious programmes on television or radio?

Always	1
Frequently	2
Sometimes	3
Rarely	4
Never	5

18.6 How important is your religious belief in your daily life?

Of utmost importance	1
Of great importance	2
Of some importance	3
Of little importance	4
Of no importance	5

Section 19:Mass Media

Finally, this last section asks about you and the mass media: radio, television, newspapers and magazines.

19.1 Which magazine do you read most often?

19.2 Which local newspaper do you read most often?

19.3 Which national newspaper do you read most often?

19.4 Which radio station do you listen to most often?

19.5 Which television channel do you watch most often?

THANK YOU VERY MUCH

WE REALLY APPRECIATE YOUR HELP

I certify that this interview has been completed in full; with the respondent and according to the instructions I received from the trainers; and that the information I received will be kept strictly confidential.

SIGNED:

_____

(INTERVIEWER'S SIGNATURE)

_____

(DATE)

_____

(EXACT TIME OF COMPLETION)